

LOTUS

COMPUTING FOR MANAGERS AND PROFESSIONALS

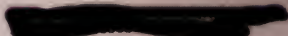
DECEMBER 1990
\$3.00



THE BEST

SPECIAL AWARDS ISSUE

READERS' CHOICE • FAVORITE 1-2-3 ADD-INS
SOFTWARE FOR THE '90s • TOP USER-WRITTEN APPLICATIONS



CIRCLE 101 ON READER SERVICE CARD

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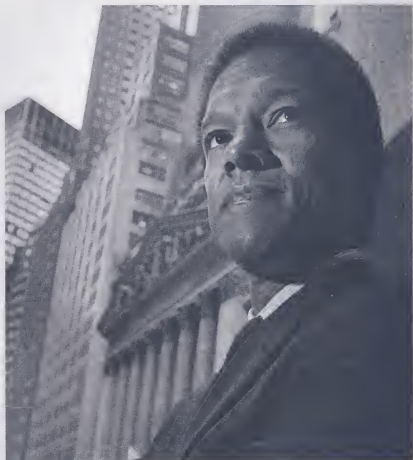
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Why Our Awards Are the Best

Before you groan over receiving yet another computer publication touting products worthy of awards, a few words about why this one is different.

Our list of the best microcomputer software, *1-2-3* add-ins, and new products is based on simple selection criteria—productivity and impact—not complexity, technical elegance, or marketing budget. You want to know which packages provide the highest return on investment of time and money. We sought answers and insights from 3,000 subscribers, as well as consultants, developers, and industry gurus.

Our reports on their answers, which begin on page 40, are part of a comprehensive customer survey by the editorial department of *LOTUS* magazine. In addition to conducting a mail survey of subscribers, *LOTUS* editors and researchers contacted by telephone and CompuServe almost 500 companies, user groups, and consultants to find the most important user-created applications. Supervising this massive project was Senior Editor Rich Friedman, who is in charge of our coverage of product reviews, industry-trend analyses, and new-product descriptions. Working with Rich were Garry Ray, Jennifer Smith, and Tracy Mayor of the Perspectives and Resources department and Fred Paul, Richard Cranford, and Kelly Conatser of the Applications department. Their extraordinary efforts produced a remarkable collection defining the state of the art in personal computing.

A unique part of our awards issue is the selection of five user-designed applications as the best noncommercial applications of *1-2-3* and *Symphony*. After contacting hundreds of sources, the Applications department pared through the nominations. The first cut contained more than 50 candidates; the second cut reduced that to 31. The top editors winnowed the list of semifinalists to the five winners, based on a methodology explained inside. Don't miss the profiles of the winners, beginning on page 65.

Inevitably, we missed some major user applications—some people are shy or have proprietary systems. We invite your letters, faxes, and electronic-mail messages advising us of important applications we didn't find this year. As Boston's baseball fans always say, "Wait till next year!"

Larry Marion
Editorial Director



■ The Perspectives and Resources staff: Friedman, Mayor, Smith, Ray

LOTUS

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Winging It

AMELIA EARTHART



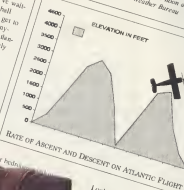
Caddy, one of my closest associates of the Atlantic solo concern not the flight itself but my departure from home. On May 19th the weather outlook was so promising we had abandoned hope of getting off that day. So I had driven in to New York from our home in Woodstock. Just before noon an urgent message caught up with me immediately to get in touch with Mr. Putnam at the Weather Bureau.

Our phone conversation was brief.

"It looks like the break we've waited for," he said. "Doc Kinnahill says the afternoon is fine if you get to Newfoundland — St. John's, say. And by tomorrow the Atlantic looks as good as you're likely to get it for some time."

I asked a few questions. A three-minute had disappeared to the south, a "high" seemed to be moving and promisingly beyond Newfoundland.

"Well, we'll start," I said. Mr. Putnam agreed he would contact Mr. Bacon, my medical adviser, who was to go with me as my way was all the way to the end of our bed."



Looking back, there are too many coincidences of that night over the Atlantic. Of course, for instance, the brass collector ring and waxed in a detached way.

If WordPerfect® 5.1 were there, she could have imported spreadsheets on the fly.

If WordPerfect® 5.1 were around in the thirties, Amelia Earhart might have used a laptop instead of a logbook. Along with being the first woman to fly the Atlantic, she'd probably be right up there with the top publishers of her day.

Even before she touched down in Ireland, her notes would be spell-checked, in newspaper format and ready to print. And knowing Amelia, she would have gone far beyond that. She could have added PlanPerfect®, Lotus 1-2-3, Excel or Quattro Pro spreadsheets to her documents.

And using function keys or pull-down menus, with or without a mouse, she could have imported bar charts, created tables, added graphics, or brought in equations to get her documents off the ground.

Amelia would have liked WordPerfect 5.1 with its dependable, toll-free support. But she probably would have picked it up for its fast and powerful features. Let's face it, Amelia loved to fly.

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TRACKING MONEY IS HARDER THAN WE THOUGHT

The model in "Do You Know What Your Money Is Doing?" is just what I need to help track my investments. However, the *Portfolio Summary* section of my worksheet does not correctly sum the current values of investments by category. The problem is associated with the @DSUM functions in column B, which are summing the values of all investments instead of distinguishing between categories.

J. S. Moore
Panama City, Fla.

The editor replies: The problem is a typo in your worksheet, not the @DSUM formulas. Because of an extra space character in the label type in cell H6, the formulas don't work. Type is a field name in the model's *Investment Register* database and a field name in the Criterion range (range A22..F24) used by the @DSUM formulas. The two field names must match exactly. Remove the extra space in cell H6.

Another problem is the omission of the

lowercase criteria in range A24..F24. In the range named cash (range A22..A24), cell A22 should contain the label type, cell A23 the label C, and cell A24 the label c. When used as the Criterion range in an @DSUM formula, this range causes the formula to sum all investments marked with a C or a c. A blank cell in this range, however, tells the formula to sum all investments, no matter how they are marked.

The model in "Do You Know What Your Money Is Doing?" is useful, but there seems to be an error in the formulas. I entered the formula @DATE(90,12,31) in cell B5 and entered in my database a bank certificate of deposit that I purchased January 1, 1990, and that is earning 10% interest per year. The template shows a return on my investment of 20.06%, but my calculator shows a return of 10%. How can I fix the formulas?

Also, most of my dividends and interest are reinvested at a rate of 7.5%, which I entered in cell J3. But what if some of my investments, such as my CD, are

reinvested at 10%? Can I substitute the value 0.1 for cell reference \$J\$3 in the formulas in columns N and R for these investments?

Edie Donat
Goshen, Ind.

The editor replies: Double counting caused most of the error in the return-on-investment calculation. In column J you entered 2000 for the original cost of the CD, and in column L you entered 200 for the total income received. But in column M you entered 2200 for the current value of the CD. To avoid counting the interest twice, enter 2000 for the CD's current value. Finally, enter the formula @DATE(91,1,1) in cell B5, rather than @DATE(90,12,31). The model will then calculate the correct return for a full year: 10%.

To better account for interest on reinvestments, put assets with different interest rates into different worksheets. Changing a single value in the formula will not update the register totals or the values in *Portfolio Summary*, which also rely on the investment rate.

This register is a general tool to track

HOW TO CONTACT US

We like to hear from you—whether you have a suggestion, a submission, a query, a complaint, or even a compliment.

You can telephone us at 617-494-1192. But we suggest that you write to us instead—via regular mail, fax, or MCI Mail. That makes it easier for us to get your communication to the right person(s).

Mail: P.O. Box 9123, Cambridge, MA 02139-9123
Fax: 617-225-6845
MCI Mail: General (Larry Manion)—412-6687
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Macros (Nicholas Delonas)—367-5360
Products (Garry Ray)—415-9379

You can also address LOTUS magazine in the LDC Spreadsheets Forum on the CompuServe Information Service. See Electronic Retrieval, below.

SUBMISSIONS

Models. To share a model with LOTUS readers, send it to the editor. Explain what problem the model solves, how the model differs from other solutions, and what lessons it teaches. Include your credentials and a floppy disk. Because of the volume of material received, unsolicited manuscripts cannot be acknowledged but will be returned if submitted with a stamped, self-addressed envelope.

Articles. If you wish to write tutorials, product reviews, case studies, or other material for LOTUS, write or send E-mail to the editor. Include your credentials and samples of your work. Because of the volume of material received, unsolicited manuscripts cannot be acknowledged but will be returned if submitted with a stamped, self-addressed envelope.

Letters. We welcome letters for publication. If you want

your letter considered for publication, send it to the editor. If your letter concerns one of our macro-oriented columns, send or E-mail it to Nicholas Delonas, macros editor.

Q&A and Good Ideas. Send submissions to Carole Thomas, technical editor.

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For information on subscription rates and address changes, see the bottom of page 2.

Back issues cost \$5 in the U.S., \$7 in Canada, and \$10 elsewhere, and the supply is limited. Write to Single Copy Sales, P.O. Box 9123, Cambridge, MA 02139-9123.

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Full text of LOTUS magazine since September 1987 is available in Computer Library, a CD-ROM product of Ziff Communications Co. Full text of LOTUS magazine since January 1988 is available on Lotus CD/Prompt, a CD-ROM product of Lotus Development Corp. (for information, call 1-800-223-1662, extension 3381). Full text of most LOTUS articles since 1987 can be found in Computer ASAP on Dialog Information Services and in Computer Database Plus on CompuServe.

Models published since 1988 are available in the LOTUS library, part of the LDC Spreadsheets Forum (GO LOTUSMAG) on CompuServe. For more information about LOTUS on-line, call CompuServe, 1-800-848-8199, and ask for representative 146; if outside the U.S. and Canada, call 1-614-457-0902. For information on how to download LOTUS models from CompuServe, see page 80 of the January 1990 issue. The models are also on Lotus CD/

Prompt.

Abstracts of selected LOTUS articles can be found through Dialog Information Services (Palo Alto, Calif.) in Microcomputer Index (Learned Information Inc.) and in Business Software Database (Information Sources Inc.).

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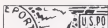
ADVERTISING

LOTUS accepts advertising only from vendors it considers responsible. If you have a problem with an advertised product that you cannot resolve with the vendor, write to Mark D. Flanagan, publisher.

Vendors. To find out how to advertise in LOTUS magazine, call our nearest sales representative. The sales staff is listed opposite the Reader Service card in this issue.

ABOUT THIS MAGAZINE

LOTUS is published monthly by Lotus Publishing Corp., a subsidiary of Lotus Development Corp., and is intended to help users of spreadsheet software. The editorial content of LOTUS is not determined by Lotus Development Corp., and the software reviews and other opinions expressed in LOTUS do not necessarily represent the views of the parent corporation.



investments. Use the @IRR function to calculate the rate of return on specific investments.

BINDING ISSUE

Before *LOTUS* changed its binding, I could find the issue I wanted just by glancing at my bookshelf. Finding issues that are stapled rather than glued into a spine won't be nearly as easy.

Also, when I went to pull out a card in the October issue, I cut my thumb on one of the "saddle stitches" (which, by the way, we always called staples). Don't worry, I won't sue you, even though the look and feel of my thumb will never be the same.

Jon Guagette
STP Inc.
De Pere, Wis.

The editor replies: Several readers miss having the date and subjects of each issue printed on the spine. We will review our choice of binding early next year.

A staple is used to bind many magazines for professionals, including *Inc.*, *BusinessWeek*, and *Scientific American*. We're sorry if it has caused any damage to readers' digits.

@ERR

In "Stock-Analysis Worksheet" (April, page 28), there's a typo in line 78 of figure 7. It should read as follows:

```
{PUT stok1,0,@ROWS(@@ (curstk))-1,fdate}
```

In "Counting the Beans While Counting the Beans" (November, page 70), the @VLOOK-UP function in the formula in cell O13 used an incorrect range. The formula should read:

```
+"(GETNUMBER ""Enter units purchased  
or sold in "&@VLOOKUP(Y16,C8..G37,2)  
&"; "" ,tmp_unit)"
```

The formula could also read:

```
+"(GETNUMBER ""Enter units purchased  
or sold in "&@VLOOKUP(tmp_code,  
itabe,2)&"; "" ,tmp_unit)"
```

In addition, the instruction to use apostrophes in cells O26 and O31 was wrong. Instead, the labels in cells O16 and O21 should begin with apostrophes.

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No grand reopening of the system, program and file every time you want to start work again.

The only thing you'll notice we've skimped on is size and weight. After all, what good is a portable if you can't take it with you?

With notebooks like the T1200XE it should come as no surprise that Toshiba sells more portable PCs than any other company in the world. After all, you're not the only one who recognizes a good thing when they see it.



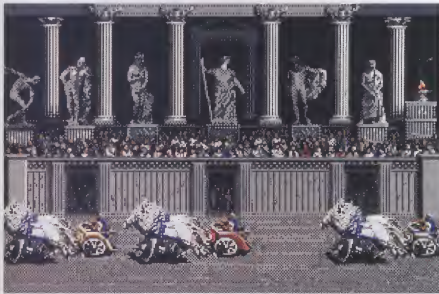
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CIRCLE 103 ON READER SERVICE CARD

High-Stakes Games

Developers of PC-based software prepare to invade the video-game market.



High-quality images and sophisticated play characterize this year's new and updated PC-based games. Ben-Hur would have enjoyed the chariot races in *Centurion: Defender of Rome*, \$49.95 from Electronic Arts.

If you loved *Super Mario Bros.*, the CD-ROM version will knock you out. Developers of PC-based game software are scrambling to get ready for the next generation of TV-based video-game machines. These new machines, such as Nintendo's latest player (so far available only in Japan), Sega Enterprises' Genesis, and NEC Technologies' TurboGrafx-16, will operate with powerful 16-bit processors and CD-ROM players.

"Frankly, we missed the boat [on video games]," says Electronic Arts president Trip Hawkins, explaining his San Mateo, Calif., company's recent entry into the 27-million-household Nintendo market.

For adults only. One reason Electronic Arts, Broderbund Software, Accolade, Spectrum Holobyte, and other PC-game developers originally bypassed the \$1 billion to \$1.5 billion video-game software market is that the audiences are different. Most PC-based games appeal to an adult

crowd that has little tolerance for the lower-quality images and less-sophisticated play that current 8-bit Nintendo machines offer. "About two thirds of our market are 25- to 45-year-olds," says Gilman Louie, chief executive officer of Spectrum Holobyte of Alameda, Calif.

Analysts and vendors agree that the key to satisfying this audience is not just the processing power of the new 16-bit (and eventually 32-bit) home game machines but also the video-quality images and sound offered by CD-ROM. "To make this into a mass market," says Electronic Arts' Hawkins, "you have to develop interactive games that look more like TV and that touch everyone."

That is precisely the task entertainment-software developers have undertaken. Although many companies are rewriting favorites from their PC library, some have also started creating games that take advantage of CD-ROM. "CDs will allow

game makers to use entirely new techniques," says David Feldman, vice president of technology for ICOM Simulations, a Wheeling, Ill., developer of CD- and disk-based games.

One of ICOM Simulations' projects is a new CD-based mystery game for the NEC TurboGrafx system based on the adventures of Sherlock Holmes. Unlike most PC games, which have relatively limited graphics and background music, this CD-based product looks and sounds more like a film or TV adventure. "We filmed 35 actors in period costumes and sets," says Feldman. To add to the realism, the game also features the actors' digitized voices.

PCs for play-at-homes. But diehard PC fans need not despair. Most companies plan to offer titles in both CD-based home-video versions and floppy- or CD-based PC versions. Some games simply play better on a PC, suggests Accolade president Allan Epstein. "Games that require a lot of memory and keyboard interaction are better suited to the PC," he says, "as are games that use sophisticated computer graphics."

A few computer manufacturers, notably Sun Moon Star, have introduced '286 and 386SX PCs with built-in CD-ROM drives for the home-computer market, but most industry observers agree that the home-based PC market won't reach the size or saturation of the Nintendo market anytime soon. There's the cost, for one thing. A fully outfitted IBM PS/1, for example, is still far more expensive than a 16-bit game machine with a CD player. Even the competitively priced Sun Moon Star '286 system costs close to \$2,500 retail.

These prices may come down, however. In an interesting twist, IBM Japan and Sega recently signed a contract to develop an IBM PC AT-compatible game computer based on Sega's Mega Drive game machine. The new machine, which will initially be sold only in Japan, is



expected to cost about 100,000 yen (\$600) without the optional CD-ROM drive.

"When companies like IBM and Apple and Microsoft talk about multimedia for the home, you are usually looking at a price tag in the thousands," says Electronic Arts' Hawkins. "It is much easier to sell to the Nintendo market a newer, more powerful version that costs around

\$500 with a CD player."

With development budgets for best-selling games now running close to \$500,000, software developers are anxiously awaiting the next big video-game surge. "We'll deliver the product in any format the consumer wants," says Hawkins, "even if it's on a piece of lettuce."

—Jon Pepper

Hot Games for 1991

This holiday season you'll see a lot of new games on store shelves. Some sure hits:

The Manhole (Activision, Menlo Park, Calif., \$49.95 for floppy-disk version, \$79.95 for CD version). This new version of Activision's multimedia favorite for the Mac is one of the first CD-based PC games. The fantasy adventure begins when you open a manhole cover and climb the beanstalk that grows out of it. Depending on whether you climb up or down, you might follow a dolphin to an undersea world, discover an octopus's garden, or chat with a penguin. The CD version includes animation in 256 colors, a soundtrack with CD-quality music (including original songs), and a digitized voice for each character. The really adventurous can choose the Japanese-language option.

Test Drive III: The Passion (Accolade, San Jose, Calif., \$59.95). Test

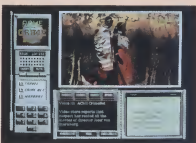


Test Drive III, \$59.95 from Accolade, is back with three new cars and lots of new scenery.

Drive III, a driving simulation, has been one of the most successful PC games of all time. Now it's back with three new cars and lots of new scenery. This time you can drive a 225-mph Chevy CERV III, a 378-horsepower

Pinfarina Mythos, or the aptly named Lamborghini Diablo. New twists include an instant-replay feature, a 360-degree chase-car view, and realistic graphics. Start your engines!

Where in the World is Carmen Sandiego?, deluxe edition (Broder-



Carmen Sandiego, \$79.95 from Broderbund Software, includes high-res graphics, digitized sound, and new music.

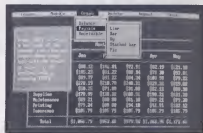
bund Software, San Rafael, Calif., \$79.95). The deluxe edition of this best-selling detective-adventure game, which has already spawned a television show, includes high-resolution digitized graphics (from National Geographic Society slides), twice as many clues as the original version, digitized sound, and new music. You'll need 6 megabytes of free hard-disk space, an IBM Video Graphics Array card, and lots of free time to chase Carmen around the globe.

Isidro: The Way of Stones (Accolade, \$54.95). You can spend five minutes learning the rules of this engrossing game and a lifetime trying to master it. As in the game of Go, you place 72 stones on a board of 96 squares. The colors and patterns of the stones impose constraints on placement, and you get more points for

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King Jaguar is especially strong in application customization. King Jaguar is fast and easy to use. King Jaguar...is an excellent program. PC Week August 20, 1990

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complicated moves like three- and four-way stone placements.

Centurion: Defender of Rome (Electronic Arts, San Mateo, Calif., \$49.95). This is your big chance to rule the Europe of 275 B.C. Take part in chariot races, sea battles, and—everyone's favorite—gladiator events, all in cinematic-like graphics. The game combines strategy and arcade-style excitement. In a pinch, try bribing your opponents or invoking the gods.

Faces (Spectrum Holobyte, Alameda, Calif., \$39.95). From Alexey Patinov, the Soviet game designer who created the best-selling *Tetris* and *Welltris* games, *Faces* presents you with falling blocks that you must maneuver into place. This time, unlike *Tetris*, the game forms human faces. Looks easy, but it's not.

Bill & Ted's Excellent Adventure (Capstone Software, Miami, \$39.95). Bodacious, dudes, it just had to happen. The movie is now a smokin', animated action-adventure game. Follow the two outrageous fellows through some exciting exploits.

Finally, in case you aren't having enough fun with your new *Windows* 3.0, Microsoft Corp. recently released the *Entertainment Pack for Windows*. This \$39.95 collection of seven games includes a version of the previously mentioned *Tetris*, two solitaire games, and a four-row, 3-D rendition of tic-tac-toe. You'll also find a traditional peg-jumping game; an Oriental game called *Taipei*, which is a bit like 3-D dominoes; and *MineSweeper*, in which you clear the mine field in a race against the clock.

—J.P.

Intel Packs a Computer on a Chip

The 386 SL promises to make portables even more portable.

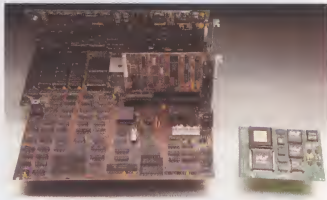
In the last 30 years, computers have shrunk from the size of a suburban garage to somewhat smaller than a breadbox. Truly tiny systems are coming soon, thanks to recent advances in miniaturized electronics from chip maker Intel Corp.

How tiny is tiny? How about an entire "386-class computer on a board about the size of your hand? Intel recently announced the 386 SL Microprocessor SuperSet, a two-chip set that replaces most of the 50 or 60 chips normally needed to create a desktop machine, except for memory. Several portable-computer manufacturers plan to put the chip set to work in new note-

book or palmtop computers, according to Intel spokeswoman Nancy Pressel, and at least one manufacturer has developed a working prototype.

Dataquest, a San Jose, Calif., research firm, expects current portable sales to triple by 1993 to 5½ million units a year, fueled by the snazzy laptop performance, improved battery life, and ultimately, lower cost that chip sets like the 386 SL are expected to yield.

A real bargain. The 386 SL's 20-MHz CPU uses a variant of CMOS technology, a low-power-consumption architecture that is ideal for portable computers. The chip integrates the cache memory and bus-



■ A board based on Intel's 386 SL microprocessor (right) has 80% fewer chips and takes up one eighth the space of a less-capable AT-class board (left).



controller circuitry usually located on separate chips. And here's the best part: The 386 SL costs only about \$20 more than all the chips in a standard 386SX machine plus the necessary support chips.

The companion to the 386 SL microprocessor, the 82360SL I/O subsystem chip, handles power management and provides an interface to most peripheral devices. The result is a '386-class system that uses 40% less board space and consumes only half the power of comparable

Flashy New Memory Option

Most people know, sometimes from harsh experience, that when you turn a computer off you lose anything stored in RAM. This is a particular problem with portable computers because they often use battery power, and batteries have a limited, sometimes unpredictable lifespan.

Ideally, memory for portables should retain its contents even when power is interrupted or shut off. Some memory chips, such as erasable, programmable, read-only memory (EPROM) chips, do retain their data without power, but they are slow and difficult to erase. To erase an EPROM, you must remove it from the computer and expose it to ultraviolet light.

Flash memory is structurally similar to EPROM, but it gets its name from the way data can be erased from its circuits: by an electrical surge while still inside the computer. The process takes about two seconds, which isn't dazzling in hard-disk terms but stacks up adequately against a floppy disk.

Most observers agree that flash memory is best suited for portable computers, particularly to store programs and data files that don't get updated frequently. Some manufacturers are beginning to use flash memory to hold a system's basic input/output system (BIOS). That means you can get BIOS updates through a local area network or modem instead of having to call a technician to open up the system and swap BIOS chips.

—R.D.

desktop systems and less than most laptops, as well.

The power savings is possible because the 386 SL can be instructed to suspend and resume operations, slow the CPU's clock speed, or hold peripheral devices in standby mode, as needed, to prolong battery life. System manufacturers have sometimes accomplished this with special software drivers or terminate-and-stay-resident programs, but these may clash with some applications, disabling power-management features and occasionally even causing a system crash.

"The ability to control power management from the processor chip offers a tremendous advantage to portable-computer manufacturers," says Robert Charlton, a Dataquest analyst.

All the trimmings. But portable systems are more than just a collection of logic chips. Intel has addressed the issue of peripherals by providing compatible, single-chip versions of a keyboard controller, a modem, and a floppy-disk controller. Scheduled to appear next year are a single-chip VGA controller for LCD screens and the Intel Network Card, a peripheral adapter about the size of a credit card. Modem and Ethernet LAN versions of the network card are in the works.

Possibly the most interesting attachment, though, is Intel's Flash Memory Card (see "Flashy New Memory Option" at left). This credit card-size device offers either 1 or 4 megabytes of program and data storage. Nonvolatile flash memory operates about as fast as a computer's main memory, yet it consumes considerably less battery power than a floppy- or hard-disk drive. On the other hand, flash memory can't be erased as easily or as quickly as magnetic memory and the current cost is high: about \$300 for the 1-megabyte card and \$1,200 for the 4-megabyte version.

The next step beyond the two-chip set of the 386 SL is the one-chip system. In-Stat, an electronics-industry research firm based in Scottsdale, Ariz., expects to see most of the major logic functions of a high-end PC packed into a single chip within a few years. Indeed, Intel claims that by 1993 it will have a complete desktop system on a single piece of silicon, except for RAM and some peripheral devices. Imagine that sitting on your lap—or in your palm.

—Richard Dalton

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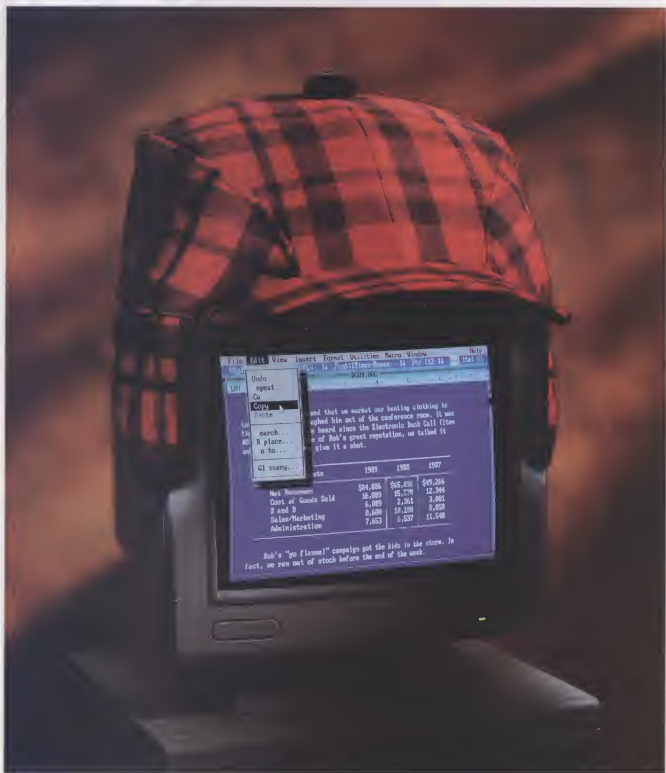
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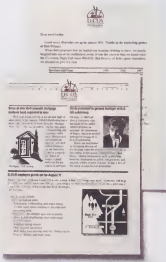
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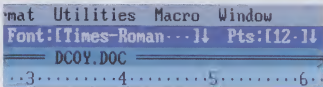
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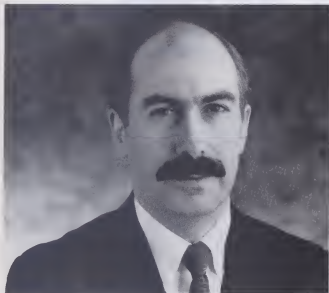
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Said Mohammadioun, Samna Corp.'s chairman and president, will become vice president of Lotus's Word Processing Division.

Lotus Acquires Samna Corp.

Lotus Development Corp. announced plans to acquire Samna Corp., developers of *Ami* and *Ami Professional* word processors for *Microsoft Windows*. In a stock tender offer that was scheduled to begin in early November, Lotus expects to pay about \$65 million for the Atlanta-based company in a transaction the companies hope to complete by year's end. Samna had revenues of \$11 million in 1989 and \$10.3 million in the first nine months of 1990.

Lotus officials say the market in word-processing software justifies the purchase price. "We stack the price up against the size of the business opportunity," Lotus CFO Robert P. Schechter says. Schechter estimates that *Windows*-based word processing now accounts for 15% to 20% of a \$700 million market that's growing 8% to 10% per year. And analysts think the graphical segment is growing at least three times faster than the overall market.

The acquisition will pit Lotus against its technology partner WordPerfect Corp. when WordPerfect comes out with the *Windows* version of its best-selling word processor sometime next year. "We will continue to work with WordPerfect and other companies on technologies and standards," says Lotus President and CEO Jim Manzi, "but we'll also be competing head-on."

"This deal will allow us to compete more effectively against both WordPerfect and Microsoft," sums up Said Mohammadioun, Samna's chairman and president. Under the terms of the acquisition, Samna will remain in Atlanta and become Lotus's Word Processing Division, and Mohammadioun will be vice president of the new division.

The acquisition also gives Lotus the opportunity to "provide tight integration between *Ami Professional* and our spreadsheet and graphics products under development for *Windows 3.0*," Manzi says. "Our highest priority is *Windows* products," he adds.

Windows 3.0 versions of

both *Ami* and *Ami Professional* shipped this year. Both products have been well received by the critics, earning Editor's Choice awards from *PC Magazine* and Best Buy ratings from *PC World*. And *Ami Professional* took top honors in the *Software Digest Ratings Report* and in a *PC Week* Corporate Satisfaction Poll.

Ami is geared for executives, and *Ami Professional* provides graphics and drawing tools, links to other *Windows* applications, macro language capabilities, and other advanced word-processing features. Lotus won't change the products' names.

Samna will continue to sell its character-based word-processing products for DOS users and *Samna Plus IV*, a word-processing package for Unix-based multiuser systems. Samna will also assume responsibility for sales and support of *Lotus Manuscript*, Lotus's character-based word processor, says Frank King, senior vice president of Lotus's Software Business Group.

A New Way to Buy Lotus Software

ComputerLand Canada and Lotus Development Corp. recently began testing a unique software-distribution system called Lotus Choices. In the pilot program, the Canadian computer dealer (no relation to the U.S.-based ComputerLand Corp.) will install versions of *1-2-3* Release 2.2, *Freelance Plus 3.01*, and *Magellan 2.0* on the hard disk of each Compaq, IBM, or Panasonic "286 or higher PC it sells to an individual or to a small or medium-size business.

"We want to give people the opportunity to test the applications in their own environment," says Kathee Andrews, a Lotus OEM marketing man-

ager who helped launch the pilot program.

Lotus originally proposed to test the Lotus Choices program domestically but encountered strong opposition from software-only dealers, who thought it gave hardware dealers an unfair advantage. "There was less opposition in Canada," says Andrews.

To run one of the applications, you select it from the Lotus Choices menu. You can run each program seven times, after which it becomes inaccessible, although you can save any files you create. Under this scheme, of course, you could run *1-2-3* forever if you never turned off your computer. "We're counting on people being too energy conscious to do that," says Andrews.

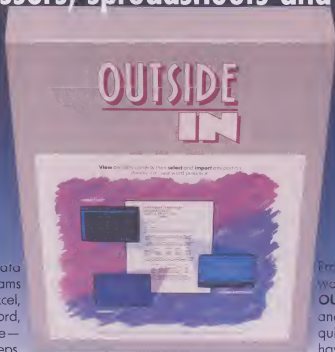
To buy an application, you just call a ComputerLand 800 number, give the representative an ID number, and arrange payment. You then get an "unlock" code to enter into the system, which makes the application permanently available. You also receive a complete package containing disks and documentation. A utility available through the Lotus Choices menu lets you delete the applications you don't want.

ComputerLand Canada has a one-year exclusive arrangement with Lotus, but after that, other Canadian resellers may adopt a similar program. Lotus isn't saying where it plans to roll out the Lotus Choices program next, "but we're looking into greater customization," says Andrews, "where resellers can offer different sets of Lotus programs."

Lotus is also looking into ways of modifying the program for software-only dealers. "We want to include the software-only resellers," Andrews says. "There's no reason the same technology can't be applied to a floppy."

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FILE5.DAT	50,000	12/15/88
FILE6.DAT	60,000	12/15/88
FILE7.DAT	70,000	12/15/88
FILE8.DAT	80,000	12/15/88
FILE9.DAT	90,000	12/15/88
FILE10.DAT	100,000	12/15/88

Pop up **OUTSIDE IN** from within your word processor. Select any directory to view files. As you scroll through filenames, each file's content is instantly displayed in its original format.

Period 1	Period 2	Period 3	Period 4
10,000	20,000	30,000	40,000
50,000	60,000	70,000	80,000
90,000	100,000	110,000	120,000
130,000	140,000	150,000	160,000
170,000	180,000	190,000	200,000
210,000	220,000	230,000	240,000
250,000	260,000	270,000	280,000
290,000	300,000	310,000	320,000
330,000	340,000	350,000	360,000
370,000	380,000	390,000	400,000
410,000	420,000	430,000	440,000
450,000	460,000	470,000	480,000
490,000	500,000	510,000	520,000
530,000	540,000	550,000	560,000
570,000	580,000	590,000	600,000
610,000	620,000	630,000	640,000
650,000	660,000	670,000	680,000
690,000	700,000	710,000	720,000
730,000	740,000	750,000	760,000
770,000	780,000	790,000	800,000
810,000	820,000	830,000	840,000
850,000	860,000	870,000	880,000
890,000	900,000	910,000	920,000
930,000	940,000	950,000	960,000
970,000	980,000	990,000	1,000,000

Zoom to a screen-wide view of any individual file. Cursor through the file to find the portion you want to copy into your word processor's current file. Select the portion to copy; then press the Insert key.

Period 1	Period 2	Period 3	Period 4
10,000	20,000	30,000	40,000
50,000	60,000	70,000	80,000
90,000	100,000	110,000	120,000
130,000	140,000	150,000	160,000
170,000	180,000	190,000	200,000
210,000	220,000	230,000	240,000
250,000	260,000	270,000	280,000
290,000	300,000	310,000	320,000
330,000	340,000	350,000	360,000
370,000	380,000	390,000	400,000
410,000	420,000	430,000	440,000
450,000	460,000	470,000	480,000
490,000	500,000	510,000	520,000
530,000	540,000	550,000	560,000
570,000	580,000	590,000	600,000
610,000	620,000	630,000	640,000
650,000	660,000	670,000	680,000
690,000	700,000	710,000	720,000
730,000	740,000	750,000	760,000
770,000	780,000	790,000	800,000
810,000	820,000	830,000	840,000
850,000	860,000	870,000	880,000
890,000	900,000	910,000	920,000
930,000	940,000	950,000	960,000
970,000	980,000	990,000	1,000,000

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Lotus/Microsoft Technology Link

Lotus Development Corp. and Microsoft Corp. are cooperating on a specification that will help link applications more tightly. What is currently known as the Compound Document Protocol Specification (CDPS) is an extension to Dynamic Data Exchange (DDE) and will link text and graphics files in both Windows and OS/2.

CDPS combines the efforts of Microsoft and Aldus Corp. with the Lotus/WordPerfect Corp. technology for hot linking the OS/2 versions of 1-2-3 and WordPerfect. In applications that support the specification, you'll be able, for example, to click on a graph or image pasted into a word-

processing document and load both the graphic and the program that created it. When you save the graphics file, any changes will be reflected in the "embedded" graphic in the word-processing document.

The companies, which had been working independently toward the same end, got together shortly after the Lotus/WordPerfect technology was demonstrated at the fall 1989 Comdex trade show, says David Reed, Lotus vice president and chief scientist. "CDPS is still work in progress," he says, estimating that it won't be completed until early to mid 1991. "Lotus has long understood the value of technologies that help integrate applications. Eventually all Lotus products will maximize these technologies."

Lotus, Paperback Settle Suit

An out-of-court settlement ended Lotus Development Corp.'s copyright-violation lawsuit against Paperback Software International of Berkeley, Calif., and Stephenson Software of Vancouver, British Columbia.

The settlement comes as little surprise in view of U.S. District Court Judge Robert E. Keeton's June ruling that Paperback Software and its development partner, Stephenson Software, violated Lotus's copyrights by copying substantial elements of 1-2-3's user interface. The settlement calls for Paperback Software to stop selling its VP-Planner spreadsheet programs and to pay Lotus \$500,000. Paperback

Software also agreed not to appeal Judge Keeton's ruling and to drop its counterclaims against Lotus.

Still pending is Lotus's copyright-infringement suit against Mosaic Software and its Twin spreadsheet. In a pre-trial hearing, Mosaic conceded that its products are copied from 1-2-3 and agreed to be bound by Judge Keeton's rulings in the Paperback case concerning the scope of Lotus's copyrights. In a trial scheduled for November 20, Judge Keeton will hear only those defenses that differ from Paperback's defenses. Lotus has also charged Borland International and The Santa Cruz Operation with similar copyright violations. Trial dates for those suits have not been set. ■

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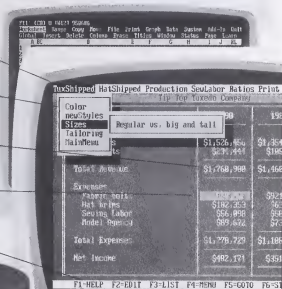
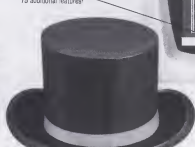
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DOS and Your Hard Disk

Take charge of the directory tree, and copy and erase files.

BY DANIEL GASTEIGER

The more software you use, the more likely it is that your hard disk contains a variety of subdirectories. You may have directories for application software such as spreadsheets, databases, and word processors, and also for the myriad data files that you generate in each application program.

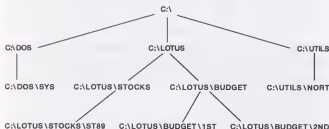
As you store more information on a disk, its directory tree becomes increasingly complex. A simply designed tree, coupled with sound knowledge of some basic DOS commands, helps you control proliferating disk files.

If you're not familiar with basic DOS commands, see last month's column, in which we introduced the essential facts.

TREE STRATEGY

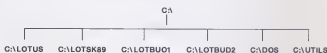
Above all, the directory tree on a hard disk must make sense to the person who uses it most. For example, if you expect to find spreadsheet budget files in a subdirectory associated with *I-2-3* program files, that's where the files should be. But be aware that when you place subdirectories within subdirectories within subdirectories, the path names to your files become rather complex.

The following figure shows the tree of a hypothetical hard disk:



Even though this tree has a logical structure, its depth makes it unwieldy. When you issue a command to DOS, you identify a file in the directory named `C:\LOTUS\STOCKS\ST89` by typing the full path name and the file name. That's 20 characters. If you need to access several files in several directories, you'll be doing a lot of typing to issue commands on this disk.

The most efficient structure for a directory tree is one in which all of the subdirectories lie immediately off the root directory, like this:



Unless you need to create dozens and dozens of directories, organizing files in a very flat directory tree saves not only a lot of keystrokes but also the work of remembering complex paths.

DOS STREET SIGNS

The unadorned DOS prompt reveals only which drive is current. It tells you nothing about which directory is current. By using the DOS `PROMPT` command, you can customize the DOS prompt to display the current drive and directory throughout a work session.

For example, if your computer's DOS prompt reads `C>` when drive C is current or `A>` when drive A is current, enter the command `prompt $p$g` at the DOS prompt. From then until you turn off the computer or issue a different `PROMPT` command, the DOS prompt displays the full path name of the current directory. So if you're working in the root directory of drive C, the prompt will read `C:\>`, but if you're working in the `\LOTUS` directory, it will read `C:\LOTUS>`.

MAKE DIRECTORIES

To make a drive current, you type the disk's drive identifier—for example, `a:-` and press Return. To change from one directory to another on the current disk, you issue the `CD` or `CHDIR` (Change Directory) command. For example, if you're working with the flat directory tree shown above, entering the command `cd\lotusk89` at the DOS `C>` prompt makes the `\LOTUSK89` directory current. But how do all of these directories get onto a disk in the first place?

Often, installation programs that copy application software onto a hard disk automatically create direc-

tories in which to store program files. These may be the only directories currently on your disk. However, you can quickly add directories to store data files by issuing the MD or MKDIR (Make Directory) command in DOS.

Consider a hypothetical example. Let's say you want to add a directory named \TEMP off the root directory of drive C. First make the root directory of drive C current. To do this, enter `c:` at the DOS prompt. Then enter the

AFTER THE DIR/P COMMAND, DOS DISPLAYS ONE SCREENFUL OF THE DIRECTORY LIST AT A TIME.

command `cd\` to ensure that you are in the root directory of drive C. Next, enter the command `md\temp`. DOS creates a directory named \TEMP.

Remember, when you issue a command in DOS, the command automatically affects the current directory. So if the directory named C:\LOTUS is current when you issue the MD\TEMP command, DOS creates a subdirectory whose path name is C:\LOTUS\TEMP. To prove that the new directory really exists, you could then enter the command `cd\temp`.

ISSUE COMMANDS FROM ANYWHERE

Sometimes it's advantageous to issue a command that affects a directory other than the current directory. Suppose that you know a file resides in one of two directories. You might change directories, issue the DIR command, and then repeat the procedure if your first guess was wrong. But you can avoid this switching by using a path name to direct the effects of the DIR command.

For example, suppose that the \TEMP directory is current and you want to learn the contents of the directory C:\LOTSK89. Enter the DIR command followed by the target directory's path name: `dir c:\lotsk89`. To list files in the \GAMES directory on your computer's D drive, enter the command `dir d:\games`. Most DOS commands allow you to use path names this way.

SCROLL CONTROL

When you issue a DOS DIR command on a directory containing more than 21 files, the first few lines in the list quickly scroll out of view. To make the display pause momentarily so that you can examine one screenful of

files at a time, use the /P parameter. When you enter `dir/p` DOS presents one screenful of files. When you're ready to view the next screenful of files, press any key.

An alternative to the /P parameter is the /W parameter, which tells DOS to use the entire screen to display file names. For example, to list the files in the directory named \LOTUS, enter the command `dir c:\lotus/w`. When you use the /W parameter, DOS omits the file size and date of creation and lists only file names and their extensions.

MAKE COPIES

There are many reasons to copy a file. Keeping backup copies of important files on floppy disks guards against hard-disk disasters. You may need to give a file to a coworker or simply want to create a duplicate file in a directory. The DOS COPY command makes light work of these tasks. The COPY command has the following syntax: `COPY sourcefile targetfile`.

Sourcefile represents the path and file name of the file you wish to copy; *targetfile* represents the drive and directory location where the copy will go and the name that the copied file should have. At its simplest, the COPY command replicates a file in the current directory but assigns the copy a new file name. For example, if a file named TEST.WK1 resides in the current directory—say, \TEMP—the DOS command `COPY TEST.WK1 BACKUP.WK1` creates a copy of the contents of TEST.WK1 but gives the copy the name BACKUP.WK1. Now the directory \TEMP contains not only the file TEST.WK1 but also the file BACKUP.WK1.

Notice that no path name was given for the file names in the previous example. When you omit path names, the COPY command affects only the files in the current directory. To copy TESTWK1 to another directory—for instance, a disk in drive A—enter the command:

```
copy test.wk1 a:\test.wk1
```

This example demonstrates another situation in which you can omit some information when issuing a DOS command. When entering a COPY command, if you wish to use the source file name as the target file name, just omit the target file name. Therefore, to copy TEST.WK1 from the current directory to drive A, enter the following command:

```
copy test.wk1 a:\
```

The previous few examples involve copying a file from the current directory to another directory. But suppose you want to copy a file from another directory to the current directory. The command `COPY C:\LOTUS\123.SET` copies a file named 123.SET from the directory C:\LOTUS to whatever directory is current when you issue the command. In this case, you omit the target path and file name entirely and let DOS use the current directory as the default.

You may want to practice copying files among directories and disks until you're confident that you understand the COPY command. Be careful not to overwrite an existing file by giving a copied file the same name.

DISK CLEANUP

Once you have practiced copying files, you may wonder how to get rid of all those extra copies. Or you might want to know how to remove outdated files that you no longer need. Just call on the DOS DEL (Delete) command, which erases disk files.

Be careful when you use the DEL command, because it doesn't stop to ask if you're sure you indicated the correct file to delete (unless you're deleting the contents of an entire directory). To delete a file named TEST.WK1 in the current directory, enter `del test.wk1`. Likewise, to delete the file from the \GAMES directory on your D drive, enter `del d:\games\test.wk1`.

When an existing directory is no longer necessary, you may wish to remove it from your hard disk. To do so, copy any files you wish to keep to another directory. Then make sure that the current directory is the one you want

to eliminate. DOS won't let you remove a directory that still contains files, so you must delete all the files remaining in the unwanted directory. To do this quickly, enter `del *.*`. The asterisks are DOS wild-card characters that represent any sequence of characters, so this command says, "Erase all files, regardless of their names and extensions." As a safeguard, it's a good idea to check the directory by issuing the DIR command before you attempt a global deletion. When you enter `del *.*`, DOS asks, "Are you sure (Y/N)?" If you're sure, enter *y* and the files will disappear.

Now change to the directory that's one branch closer to the root than the empty one. Issue the RD (Remove Directory) command. For example, once you've deleted the files from the directory C:\TEMP, change to the root directory and enter the command `rd \temp`.

The next installment of Start Here concludes our tour of DOS with a look at some of the external DOS commands, such as FORMAT and DISKCOPY, and explores how to manage files on floppy disks. ■

Daniel Gasteliger is a 1-2-3 and Symphony consultant in Boston and a contributing editor to LOTUS.

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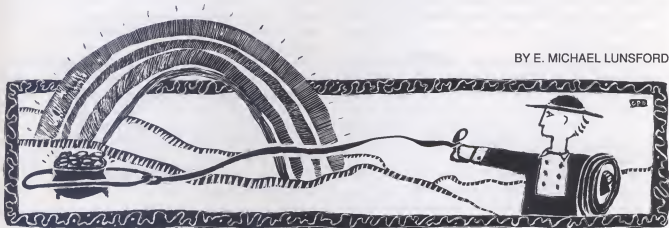
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Looking Over Overlooked Features

Macros that move specialized functions into the mainstream

BY E. MICHAEL LUNSFORD



It's not always easy to understand the unique features in the newer releases of 1-2-3. In this article, we'll explore some of these features by building macros that can simplify your work.

Some features that were introduced in 1-2-3 Releases 2.2 and 3.x are obvious. For example, Release 2.2's new Add-In command appears on the main menu, and the 3D worksheet capability of Release 3.x is one of its best-known features.

But other new features are easy to overlook: the {SYSTEM} command, which can call the DOS shell and even execute a DOS command; the Margins None option in the Print menu; the Range Search command; the ability to use the @CELLPOINTER("address") formula as the first argument in a {LET} command; the @CELLPOINTER("filename") function; and the File Admin Table command, which produces a table of file names for any directory. We'll use a few of these features to develop three useful routines for your macro library.

USING THE {SYSTEM} COMMAND AND THE RUN KEY

The {SYSTEM} command lets you jump temporarily into the DOS shell. It is the macro equivalent of selecting /System, but it differs in one important way: {SYSTEM} can take an argument. For example, you can include an instruction to run an internal DOS command such as DATE or TIME, an external DOS command such as FORMAT, a custom batch file, or an executable file.

Once the DOS command or batch file has run, you return to 1-2-3. In contrast, if you access DOS by selecting

/System, you must type *exit* to return to 1-2-3.

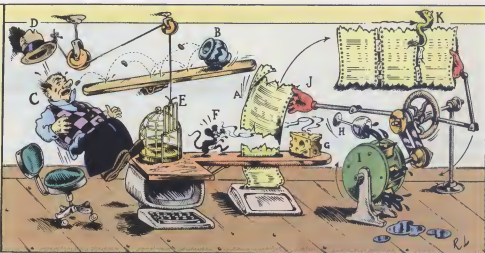
The figure below shows a simple macro that uses the {SYSTEM} command to check your computer's internal clock. This macro is handy for date-sensitive operations run on a computer that doesn't remember the date and time when you turn it off.

	A	B	C	D
1				Clock Date and Time Check
2	\0	()		
3	#clock	(IF @YEAR(@NOW)<90){SYSTEM "DATE"}{SYSTEM "TIME"}		

The macro starts with a null routine, which is a left brace followed by a right brace. This null command is used as a place marker, allowing macro processing to continue in the next row. The {IF} statement in the next row uses the @YEAR and @NOW functions to determine whether the computer's internal clock is set to a year earlier than 1990. If it is, the clock is wrong, and the macro uses the {SYSTEM} command to switch temporarily to DOS and run the DATE command. After you have corrected the date, the macro uses the {SYSTEM} command to run the DOS TIME command. After you have corrected (or accepted) the time, the macro exits the DOS shell, returns to 1-2-3, and macro processing stops.

This macro is named \0, which means that it is autoexecuting. It runs when you retrieve the worksheet file that contains it. This also means that you can't test the macro by holding down the MACRO key (Alt on most computers) and pressing 0, because 1-2-3 does not recog-

MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, CRAWLS THROUGH SPREADSHEET ONLY TO DISCOVER HE HAS BEEN FOOLED BY ARAMA OF OVER-RIPE GORGONZOLA (G) IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSED GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA. SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



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nize MACRO-Ø as a way to start a macro.

But in Releases 2.2 and 3.x, you can use the RUN key (Alt-F3) to start a macro. Press RUN and select the Ø range name from among the list of range names offered. Or press RUN, press Escape, point to the cell containing the first command of the macro, and press Return.

There is another way to use the RUN key. If you give the macro an additional range name, you can press RUN and then select that name from the list of range names offered. If the first letter of a range name is a pound sign (#), that name appears among the first names in the list, making it easier to find and select. You can also use other lower ASCII characters, such as the asterisk.

This is where the null subroutine comes in. By making the first cell of the macro a null command that 1-2-3 simply bypasses, you can give the macro two opening range names: the range name Ø on the inconsequential first line and the range name #clock on the next line. Use the Range Name Labels Right command to assign the labels in range A2..A3 as range names for the adjacent cells in column B.

ENHANCING THE RANGE SEARCH COMMAND

One of the most useful commands in Releases 2.2 and 3.x is the Range Search command. With it you can search for a string or part of a string anywhere in your worksheet. Better still, you can replace that string with another string, with blank spaces, or with nothing at all, thereby eliminating the string from your search range.

Unfortunately, the Range Search feature has two significant drawbacks. After you have initiated a search and 1-2-3 has found the first match, you can continue your search forward to the next match, but you can't back up to the previous match. Thus, if you accidentally pass the item you want, you can't get back to it without restarting the Range Search operation. What's more, you can't edit a found item in the middle of a Range Search operation and then continue your search to the next item. Instead, you must quit, edit the text, then restart the Range Search operation.

But there is a solution. The macro shown above keeps track of the number of items found and can very quickly take you to the previous item, or allow you to edit the current item, before taking you to the next item. Enter the labels as shown. Precede the labels in cells A6, A7, and B7 with an apostrophe. Use the Range Name Labels

	A	B	C	D	E
5					Find Next or Previous /Range Search Item
6	Ø				
7	#find	/RS(?)^(?)^BF			
8		(LET fnum,0)			
9	floop	(MNUCALL fmenu)			
10		(BRANCH floop)			
11	fmenu	Next	Previous	Edit	Quit
12		Find next match	Find previous match	Edit current match	Quit
13		(fnext)	(fprev)	(fedit)	Q(ESC)
14					(QUIT)
15	fnext	(LET fnum,fnum+1)N			
16					
17	fprev	(WINDOWSOFF)(PANELOFF)Q/RS^BF			
18		(FOR fctr,1,fnum-1,floop2)			
19		(IF fnum=0)(LET fnum,fnum-1)			
20		(PANELON)(WINDOWSON)			
21					
22	fedit	Q(EDIT)^(?)^(WINDOWSOFF)(PANELOFF)/RS^BF			
23		(FOR fctr,1,fnum,1,floop2)			
24		(PANELON)(WINDOWSON)			
25					
26	floop2	N(RETURN)			
27	fnum				
28	fctr				

Right command to assign the labels in column A as range names for the adjacent cells in column B. Then press MACRO-F to start the macro.

Enter a range to search and a string to search for. Then select Next or Previous from the custom menu to search forward or backward. Select Quit to edit a cell and then continue the search. Here's how the macro works:

Ø doesn't do anything. As in the previous macro, this null command allows you to use the next line as an alternate starting point.

/RS(?)^(?)^BF starts the Range Search command, pauses for you to select a search range, and presses Return. Then it pauses for you to enter a search string and presses Return. The macro selects Both (you can change the B to F, for Formulas, or L, for Labels), then selects Find.

(LET fnum,0) initializes the cell named fnum to 0 in preparation for counting the matches.

(MNUCALL fmenu) calls the menu instructions that start in the cell named fmenu with the menu choices Next, Previous, Edit, and Quit.

(BRANCH floop) loops macro control to the floop routine. Thus, the macro displays the custom menu until you select Quit or until there are no more occurrences of the search string in the search range.

If you select Next from the custom menu, the macro calls the fnext routine. This routine finds the next occurrence of the search string. Here's how it works:

(LET fnum,fnum+1)N stores a value in fnum that is one greater than the last number stored there and presses N, for Next.

If you select Previous from the custom menu, the

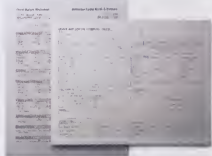
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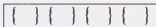


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macro calls the *fprev* routine. This routine finds the previous occurrence of the search string but does not highlight that string in the control panel. If you want the string highlighted, remove the [WINDOWSOFF][PANEL-OFF] commands from cell B17. Here's how *fprev* works:

[WINDOWSOFF][PANELOFF]Q/RS~BF freezes the screen display and presses Q to quit the Range Search operation. The macro then selects /Range Search to start the search at the beginning, accepts the previous search range and search string (indicated by the two tildes), and selects Both and Find.

[FOR fctr,1,fnum-1,1,loop2] starts a [FOR] loop, which runs the *floop2* routine the number of times indicated by the value in *fnum* minus one. This routine is simply a press of the letter N, for Next, so it runs through all but the last of the matches very quickly.

[IF fnum>0][LET fnum,fnum-1] determines whether the value in *fnum* is greater than zero. If it is, the macro decreases that value by one to keep an accurate record of your match number.

[PANELON][WINDOWSON] reactivates the screen display.

If you select Edit from the custom menu, the macro calls the *fedit* routine, which lets you edit the current occurrence of the search string. Here's how *fedit* works:

Q[EDIT]?~[WINDOWSOFF][PANELOFF]/RS~BF quits the Range Search operation, switches to Edit mode, and pauses for your entry. When you press Return, the macro freezes the screen display to suppress screen flicker. It then restarts the Range Search operation.

[FOR fctr,1,fnum,1,loop2] starts a [FOR] loop that runs through the items already found, as in the *fprev* routine. Here, however, the macro stops searching at the item you just edited.

[PANELON][WINDOWSON] reactivates the screen display.

This macro is surprisingly fast and is a useful addition to any macro library.

USING THE @CELLPOINTER("address") FORMULA IN A [LET] COMMAND

Another feature unique to Releases 2.2 and 3.x is the ability to use @CELLPOINTER("address") as the first argument in a [LET] command. You may already know how to save the current cell's address by using a command something like this:

```
[LET here,@CELLPOINTER("address")]
```

This command stores the address of the current cell in the cell named *here*. You might try to enter the contents of *here* into the current cell by reversing the arguments in the [LET] command:

```
[LET @CELLPOINTER("address"),here]
```

But this technique doesn't work in Release 2.01. In that release, you have to use string formulas that must be recalculated with the [CALC] or [RECALC] command as the macro runs.

This macro technique does work in Releases 2.2 and 3.x. For example, you can use it to create a short macro to center a title across the range of columns that fill your screen. To see how this technique works, enter the labels shown below. Use the Range Name Labels Right command to assign the labels in range A31..A35 as range names for the adjacent cells in column B. Now press the Home key and then the Tab key to move the cell pointer to the upper-left corner of a blank area of the worksheet (cell I1). Press MACRO-C and enter your name when the macro prompts you for a title. The macro centers your

	A	B	C	D	E
30					
31	\c	O			
32	#center	(GETLABEL "Enter title to center: ",ctr)			
33		(LET @CELLPOINTER("address"),@REPEAT(" ",36-@LENGTH(ctr)/2)&ctr)			
34		~[QUIT]			
35	ctr				

name on the screen by adding enough spaces before your name in the current cell. Here's how it works:

{ } doesn't do anything. The macro starts with a null subroutine in the cell named \c. The functional macro starts on the next row in the cell named #center.

(GETLABEL "Enter title to center: ",ctr) prompts you for a title to center across the screen and stores your response in the cell named *ctr*.

{LET @CELLPOINTER("address"),@REPEAT(" ",36-@LENGTH(ctr)/2)&ctr} enters the results of the string formula @REPEAT(" ",36-@LENGTH(ctr)/2)&ctr in the current cell. This formula enters up to 36 space characters (one half of a 72-character line minus one half the length of your title) and adds those spaces to the beginning of the string you entered.

~[QUIT] presses Return to refresh the current cell, then halts macro processing.

The result is a centered title. Note that to center the title on the screen, you must run the macro from the leftmost column of the screen. ■

E. Michael Lunford is the developer of 101 Macros Plus for 1-2-3 (Individual Software Inc.) and author of *Macros, Menus, and Miracles for 1-2-3* (John Wiley and Sons).

The model in this article can be downloaded from Compu-Serve. For more information, see the box on page 4.

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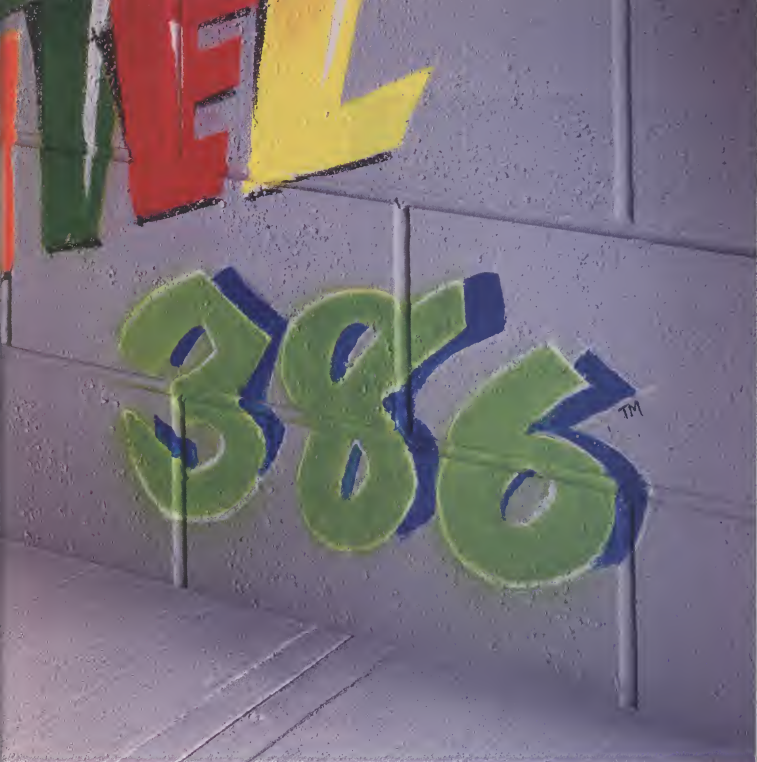
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TECHNIQUES

FOUR MACRO CHALLENGES

We give you problems
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macro solutions.

BY LARRY ROSHFELD

Here are four problems, each of which you can solve by writing a small *1-2-3* or *Symphony* macro. Following the description of each problem is a list of suggested macro commands and @functions to use in your solution.

Solve the challenges in order, as they build upon one another. You'll learn to use the {FOR}, {BRANCH}, {MENUBRANCH}, and {GETNUMBER} macro commands, create a "looping" macro, and build a custom macro menu that uses dynamic code.

Record macro instructions as labels in one column. Type an apostrophe at the beginning of each line of macro code that starts with the symbol @, /, or —.

The macro solutions use two common conventions. The macro name and subroutine names appear in one column and are named by using the Range Name Labels Right command. Alternatively, you can use the Range Name Create command to assign individual macro and range names.

Keep in mind that there are many ways to solve any problem and that you may very well devise faster, shorter, or more elegant solutions than those presented here. If you get stymied, take a peek at our solutions.

JOHN BREACKY

CHALLENGE 1

PROBLEM. Your company markets a successful line of dolls: the Middle-Aged Mythical Monster Men. You need to enter a year's worth of sales data into the following worksheet:

	A	B	C	D	E
61		Argus	Caliban	Cyclops	Fafnir
62	January				
63	February				
64	March				
65	April				
66	May				
67	June				
68	July				
69	August				
70	September				
71	October				
72	November				
73	December				

Create a macro that allows you to make an entry and then automatically moves the cell pointer down one cell. After you enter all the data in a column, the macro should automatically move the cell pointer to the top of the next column. When you finish entering all the data, the cell pointer should return to the cell in which it started.

To ensure that this macro will be useful in other worksheets, allow the user to specify the number of columns and rows of data to be entered. Also, assume that you must position the cell pointer in the first cell of the first column to contain data—in this case, cell B62—before you invoke the macro.

TOOLS. (GETNUMBER), (FOR), (?), cursor-movement commands

SOLUTION. To begin, think through the steps that the macro must perform. It must ask you to specify the size in columns and rows of the data-entry area. With this information, the macro can keep track of how many times it must move the cell pointer down before moving it over to the top of the next column and how many columns to fill before stopping.

The macro solution shown to the right uses two (FOR) commands to create two program loops. The loops allow the macro to reuse one set of commands to enter data. Remember: Before you invoke the macro, you must position the cell pointer in the first cell of the first column

into which you want to input data.

Here's how the macro works.

[GETNUMBER "How many columns of data to enter? ",cols] The (GETNUMBER) command takes two arguments: a prompt string and a location. The prompt string appears on the control panel, and macro processing stops to allow you to enter a number. After you type a number and press Return, 1-2-3 and Symphony store the number in the specified location. This (GETNUMBER) command presents the prompt *How many columns of data to enter?* and stores the number you enter in the cell named cols.

[GETNUMBER "How many rows of data to enter? ",rows] This command displays the prompt *How many rows of data to enter?* and stores the number you enter in the cell named rows.

Other macro commands use the numbers stored in rows and cols to determine how many times the cell pointer should move down a row and how many times the cell pointer should move to the next column.

[FOR counter1,1,cols,1,loop1] The (FOR) command creates a loop—that is, it repeats a macro subroutine a specified number of times. The command takes five arguments: counter, start value, stop value, step value, and subroutine. The start, step, and stop numbers determine the total number of repetitions. The counter cell keeps track of the number of repetitions.

In this example, counter1 is the name

of the cell that keeps track of how many times the macro has looped. The start value of counter1 is 1. The stop value is the number of columns you specified; it is stored in the range named cols. The step value for the counter is 1. Finally, the subroutine that this (FOR) command repeats is named loop1. Each time the macro repeats the loop1 subroutine, counter1 increases by 1 until it is equal to the stop value specified in the cell named cols.

The loop1 subroutine contains two lines of code.

{FOR counter2,1,rows,loop2} This (FOR) command manages a second loop. It runs the loop2 subroutine, which is used for the actual data entry. The counter is named counter2. The start value is 1. The stop value is the number of rows you specified; it is stored in the cell named rows.

The loop2 subroutine allows you to type a number and press Return. Then the macro moves the cell pointer down one row. The loop1 subroutine checks to see if the value in the cell named counter2 is equal to the stop value in the cell named rows. If it isn't, the cell pointer stays in the current location, and the (FOR) command in loop1 again passes control to the loop2 subroutine, allowing you to enter the next number in the column.

The second loop continues until the value in counter2 is equal to the value in rows. This completes the (FOR) command in cell B6, and the macro then processes the line of code in cell B7. This command moves the cell pointer to the right once and then moves it up the number of cells specified in the range named rows. Since there are no more commands in the loop1

	A	B	C	D	E	F	G	H
1	\a	(GETNUMBER "How many columns of data to enter? ",cols)						
2		(GETNUMBER "How many rows of data to enter? ",rows)						
3		(FOR counter1,1,cols,1,loop1)						
4		(LEFT cols)						
5								
6	loop1	{FOR counter2,1,rows,1,loop2}						
7		(RIGHT)(UP rows)						
8								
9	loop2	(?)						
10		(DOWN)						
11								
12	counter1							
13	counter2							
14	cols							
15	rows							

subroutine, macro control passes back to the [FOR] command in cell B3.

If the value in *counter1* is equal to the value in the cell named *cols*, the [FOR] command is complete and the macro stops. However, if the value in *counter1* is less than the value in the cell named *cols*, the [FOR] command again calls the subroutine *loop1* to allow you to enter data into the rows of the current column and then moves the pointer to the top of the next column.

Whether you use our solution or your own, you must enter data into the entire data entry area—range B62.E73—before going on to Challenge 2.

CHALLENGE 2

PROBLEM. If the first challenge stumped you, don't despair. This one is easier. Now that you've entered the sales data, you decide to modify the spreadsheet so that it includes quarterly totals by product. Although you could perform this task manually, you decide to write a macro that automates the process.

TOOLS. [BRANCH], [IF], [QUIT], cursor-movement keys, @CELLPOINTER, @SUM **SOLUTION.** To begin, perform the task once manually. By doing so, you'll better understand the steps the macro needs to take to calculate the quarterly totals. Move the cell pointer to the January value for Argus sales—cell B62 in the first figure. Now move the cell pointer down three cells to the value for April Argus sales—cell B65. Insert two blank rows. These provide a place to record the quarterly summary formulas. Enter an @SUM formula that totals the three cells above the current cell and copy that formula to range C65.E65 to obtain quarterly totals for each of the other three products.

The macro shown below performs exactly this sequence of steps. If you followed the instructions to perform the

macro's work manually, be sure to delete the two rows you inserted before you run the macro.

You must also remember to position the cell pointer on the first cell you want to include in the first quarterly subtotal—in this case, cell B62—before you invoke the macro.

[IF @CELLPOINTER("type")="b"] [QUIT] The @CELLPOINTER("type") formula checks the contents of the current cell and returns *b* if the cell is blank, *v* if the cell contains a value, or *l* if the cell contains a label. The [IF] macro command checks whether the current cell is blank. If it is blank, then the macro has finished calculating the quarterly subtotals in the table and the [QUIT] command stops the macro. If it is not blank, macro processing continues with the next line of macro code.

[DOWN 3] This command moves the cell pointer down three cells to the first value for the first month of the next quarter.

/WIR[DOWN]~ (in *Symphony*, [MENU] [R[DOWN]~]) This line of code inserts two blank rows between the entries for the last month of one quarter and the first month of the next quarter.

@SUM([UP 2].[UP 2])~ The macro enters an @SUM formula that totals the values for the quarter.

/C~[RIGHT].[RIGHT 2]~ (in *Symphony*, [MENU]C~[RIGHT].[RIGHT 2]~) The macro selects the Copy command and copies the current cell containing the @SUM formula across the row to total quarterly sales for the other three products.

[DOWN 2] The macro moves the cell pointer down two cells.

[BRANCH \b] The [BRANCH] command redirects macro processing from the current cell to the location listed in the command. In this case, macro control returns to the cell named \b, in cell B17. Once again, the [IF] command checks whether the current cell is blank. If it is not blank, then the cell pointer is still within the table and the macro repeats itself. If the current cell is blank, the macro has completed all of the quarterly summations and processing stops.

CHALLENGE 3

PROBLEM. Now suppose you want to create a custom macro menu that allows you to select the macros in Challenges 1 and 2 that you want to run and, once you've made a selection, runs the appropriate macro. Create a *1-2-3* or *Symphony* macro menu that presents you with the menu options Entry, Subtotals, and Quit.

TOOLS. [MENUBRANCH], [subroutine], [QUIT]

SOLUTION. To build a macro menu, use the [MENUBRANCH] command, which takes only one argument: the location of the macro menu. When this command is executed, the control panel displays the macro menu found in the location and waits for you to make a menu selection. The macro then processes the commands associated with that menu selection.

The menu itself contains at least three rows. The first row contains up to eight menu selections, entered one to a cell. The second row contains a description, or long prompt, that will appear under each menu selection when you run the macro. The third and subsequent rows contain macro instructions associated with each menu selection.

The figure at the top of the next page shows the macro solution to this problem. [MENUBRANCH main1] This command indicates that the macro menu is located in a range named *main1*. This range contains labels that are the menu selections. The labels in row 30 are the selection descriptions, or long prompts, that appear when you run the macro and highlight a menu selection. Row 31 contains macro commands that run when you make a menu selection. Here we used subroutine calls to the macros named \a and \b, which manage the data-entry and subtotal processes, respectively.

Using this macro menu, highlight the menu selection Entry, and the prompt *Enter budget data* appears. If you press Return to choose that menu selection, the macro named \a, which we discussed in Challenge 1, runs. After that subroutine finishes running, the [MENUBRANCH] command in cell B32 redisplay the custom menu.

If you highlight the Subtotals selection, the prompt *Create subtotal report* appears. If you press Return to choose that menu selection, the macro named \b,

	A	B	C	D	E
17	\b	{IF @CELLPOINTER("type")="b"}[QUIT]			
18		[DOWN 3]			
19		/WIR[DOWN]~			
20		@SUM([UP 2].[UP 2])~			
21		/C~[RIGHT].[RIGHT 2]~			
22		[DOWN 2]			
23		[BRANCH \b]			

	A	B	C	D
27	\c	(MENUBRANCH main1)		
28				
29	main1	Entry	Subtotals	Quit
30		Enter budget data.	Create subtotal report.	Quit this macro.
31		(\a)	(\b)	(QUIT)
32		(MENUBRANCH main1)	(MENUBRANCH main1)	

which you created in Challenge 2, runs. After that subroutine finishes running, the (MENUBRANCH) command in cell C32 redisplay the custom menu.

If you highlight the Quit choice, the prompt *Quit this macro* appears. Select *Quit* and the macro stops.

CHALLENGE 4

PROBLEM. Now that you have created a simple macro menu, let's enhance it. Suppose you want to ensure that whoever uses the macro chooses the Entry selection and performs data entry before choosing the Subtotals selection. Modify the macro menu developed in Challenge 3 to create a self-modifying menu that allows you to select Subtotals only if you have already selected Entry.

TOOLS. (MENUBRANCH), (LET), (CALC), (subroutine), @IF

SOLUTION. The solution to this challenge relies on what's called dynamic macro code. While most macro code is in the form of a label, dynamic macro code uses string formulas, which enable current worksheet conditions to determine the course of the macro. In this case the result of @IF formulas, which cause the macro to process different sets of keystrokes, depends on whether the user has

already selected the Entry option.

The figure below shows a solution. /REflag" (In *Symphony*, (MENU) Eflag") This line of code erases the range named *flag*, which is located in cell B38 and keeps track of whether you have already selected the Entry menu choice. If you haven't selected Entry from the menu, the range named *flag* is blank. If you have already selected Entry, the *flag* range contains a 1.

(MENUBRANCH main2) This command indicates that the custom macro menu is located in the subroutine named *main2*.

Let's look at how the macro manages each menu selection. As in Challenge 3, the label *Entry* and its corresponding long prompt appear in cells B40 and B41, respectively. If you select Entry from the menu, here's what happens.

(set_flag) This command transfers macro control to the subroutine named *set_flag*. Here's what *set_flag* does.

(LET flag,1) This line enters the value 1 in the location named *flag*, cell B38. This flag is used by @IF formulas in range C40..C42, called *formulas*, to control whether the user can select Subtotals from the menu.

(RECALC formulas) This line recalculates three @IF formulas, located in the *formulas* range. We'll take a closer look

at the formulas in a moment. After the formulas recalculate, macro control passes to cell B43.

(\a) This command calls the subroutine \a, which was the data-entry macro created in Challenge 1.

(MENUBRANCH main2) When the macro finishes processing the commands in the \a macro, this command redisplay the custom macro menu, which allows you to make another selection.

Now let's look at the Subtotals portion of the menu. The *formulas* range (C40..C42) contains three formulas that manage display of the Subtotals menu selection and corresponding long prompt and control the flow of the macro.

Cell C40 contains this formula:

@IF(flag=1,"Subtotals","(Subtotals)")

This formula says that if the value of the range named *flag* equals 1—indicating that you have already selected Entry from the menu—then the label *Subtotals* appears as the menu choice. If it does not, the label (*Subtotals*) appears.

A similar formula in cell C41 controls the long prompt:

@IF(flag=1,"Create subtotal report.", "This option not available.")

If you have already selected Entry from the menu, the long prompt reads *Create subtotal report*. If you haven't, the long prompt reads *This option not available*.

Cell C42 contains this formula:

@IF(flag=1,"(\b)","(MENUBRANCH main2)")

If you have already selected Entry, the *flag* range equals 1 and macro control passes to the (\b) subroutine, the subtotal macro you created in Challenge 2. If you haven't selected Entry, the macro redisplay the menu.

Cell D40 contains the label *Quit*, which appears as a menu selection along with its corresponding long prompt *Quit this macro*. Select *Quit* and the macro stops. ■

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	A	B	C	D
35	\d	/REflag"		
36		(MENUBRANCH main2)		
37				
38	flag			
39				
40	main2	Entry	(Subtotals)	Quit
41		Enter budget data.	This option not available.	Quit this macro.
42		(set_flag)	(MENUBRANCH main2)	(QUIT)
43		(\a)		
44		(MENUBRANCH main2)		
45				
46	set_flag	(LET flag,1)		
47		(RECALC formulas)		

The model in this article can be downloaded from CompuServe. For more information, see the box on page 4.

microcomputers.

Many industry observers still see OS/2, with its inherent multitasking functionality, as the eventual PC standard. For those who see the appeal

Computer Systems News, May 28, 1990

den in designing complex applications for OS/2. OS/2 will become a more attractive option for the future as users learn to take better advantage of its multitasking, enhanced de-

PC Week, August 13, 1990

ture. And software developers know that it will need to migrate to OS/2 eventually. Software developers know that it will need to migrate to OS/2 eventually.

PC Magazine, September 11, 1990

users will choose OS/2 Presentation Manager will be the strategic environment that will carry PC users into the next century. Software developers will choose OS/2 Presentation Manager will be the strategic environment that will carry PC users into the next century.

PC Magazine, September 11, 1990

to give up a thing to do it. Eventually, we need OS/2 and all the power and safety the operating system brings.

Will Fastie, The Fastie Report, May 31, 1990

“Eventually” is here.

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TAKE IT TO THE LIMIT ONE MORE TIME

TECHNIQUES

1-2-3/G's Solver finds the optimal solution to your business problems.

BY KELLY R. CONATSER

Where to build a warehouse. Which transistor should be your flagship product. When to schedule a factory run. Before the advent of PCs, companies devoted valuable mainframe resources to help make these big decisions with mathematical optimization

techniques. With the arrival of PC-based optimizers like 1-2-3/G's Solver, the uses of optimization now run the gamut of complexity. In the November issue (page 45), we applied the Solver to the simple manufacturing problem of Wild Gourmets, a company that produced two types of animal feed from a single ingredient.

The figure to the left extends this example to show how the Solver tackles a more difficult problem. Suppose Wild Gourmets expands its production to include four products rather than two. All four products are now sold in larger sacks and include healthful ingredients that wild animals prefer: corn meal, a protein supplement, oat bran, and sun-dried tomatoes. But each product calls for a different mix of these four ingredients, and the sacks vary in size. For example, a sack of new-formula rabbit feed requires 75 pounds of corn

meal, 45 pounds of protein supplement, 100 pounds of oat bran, and 50 pounds of sun-dried tomatoes.

In addition, each product has a separate profit level per sack. Rabbit feed generates a profit of \$75 per sack; deer feed, \$50 per sack; bird feed, \$90 per sack; and badger feed, \$25 per sack.

What product mix will optimize Wild Gourmets' profit? By setting up a worksheet like the one in the figure, you can use the Solver to find the answer.

To create the model shown in the figure, enter all labels from the figure, and enter the numbers in ranges B3..E6, B10..E10, and G3..G6. Enter zeros in range F3..F6 rather than the numbers that appear in the figure.

Enter the following formulas:

Cell	Formula
H3	+F3-G3

Copy this formula to range H4..H6.

Cell	Formula
H8	@SUM(H3..H6)
B11	+F3-B3*\$F4-B4+\$F5-B5+\$F6-B6

Copy the formula in cell B11 to range C11..E11.

Cell	Formula
E14	+B11<=B10
E15	+C11<=C10
E16	+D11<=D10
E17	+E11<=E10
E18	+F11<=F10

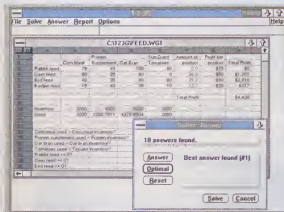
Use the Copy command to copy the formula in cell E18 to range E19..E21.

Select Range Format Fixed 1 and indicate range F3..F6. Assign range G3..H8 the Currency format with no decimal places.

Finally, select Range Name Create, enter the name *adjustable*, and indicate range F3..F6. Repeat this procedure to name the following two ranges:

Name	Range
constraint	E14..E21
optimal	H8

The formulas in range B11..E11 calculate the amount of each ingredient used, based on the values in the adjustable cells. Each time the Solver comes up with a new set of inputs for the adjustable cells, 1-2-3/G recalculates the formulas in range B11..E11. The Solver then checks to see if the new results of the formulas



The Solver returns the best answer found, rather than the optimal answer, if it hasn't finished solving the problem or if the structure of the problem prevents the Solver from finding an optimal answer. The black Solve option at the bottom of the answer window indicates that the Solver can find more answers to this problem. A gray Solve option indicates that the Solver has found all possible answers.

violate any constraints.

In this case the constraints in range E14..E17 come into play. The formulas in range E14..E17 ensure that the amount of each raw material required in a given product mix doesn't exceed the supply on hand. The formulas in range E18..E21 force the Solver to substitute only non-negative quantities of the raw materials into the adjustable cells in range F3..F6. In this scenario there are no limits on the number of feed sacks available, so there are no constraints involving feed sacks. The company's inventory of ingredients represents its only limit on production.

Select Utility Solver from the main menu and indicate the range names *adjustable*, *constraint*, and *optimal* in the appropriate boxes in the Solver definition window. Specify Max to maximize for the optimal cell, then select Solve.

Each time you select Solve, the Solver finds a predetermined number of answers, then suspends its activities. If the Solver is working from its default settings, it will stop after finding 10 answers. On a 386SX machine running at 16MHz, the Solver finds these answers in less than a minute.

Select Optimal to make your screen match the figure. Total profit is \$4,428. Notice that the Solver has returned the message *Best answer found* rather than *Optimal answer*.

Generally, *Best answer found* means either that the Solver hasn't found all possible answers or that the structure of the problem prevents the Solver from returning an optimal answer. In this case it's the former. Because the Solve option at the bottom of the answer window appears in black, you can tell that the possible answers have not yet been exhausted. If the Solver had found all the valid answers, the Solve option would appear in a barely visible gray.

If you decide to continue with the problem, the Solver picks up where it left off. It continues to find answers in groups of 10 until you specify otherwise. To change the default, select Options Number Answers from the Solver menu at the top of the screen. Select All from this menu, then select OK or press Return. This setting tells the Solver to keep working until it finds every possible answer.

Select Solve from the answer window to continue with the problem. The Solver finds one more answer before reporting

that the problem is 100% solved. Notice that the Solve option at the bottom of the answer window now appears in gray.

Select Optimal. The Solver now reports an optimal answer rather than a best answer found. The product mix has changed to 0 sacks of rabbit feed, 18.1 sacks of deer feed, 21.7 sacks of bird feed, and 69.7 sacks of badger feed. (For tips on rounding these numbers, see "Can 4.72 out of 5 Doctors Agree?" on page 48 in the November issue.) Total profit, \$4,602, is indeed higher than the previous best

LIKE ANY 1-2-3 COMMAND, THE SOLVER CAN BE AUTOMATED WITH MACRO COMMANDS.

answer, \$4,428. From this we can conclude that the last answer the Solver found is the optimal answer. The Solver ranks the answers it reports, so the optimal answer is Answer #1, rather than Answer #11.

The optimal answer isn't always the last answer found, so the Solver's ability to suspend its activities and report its progress is especially helpful when a problem takes a long time to solve. To stop the Solver in midstream and view the answers it has already found, select Cancel from the Solver's progress window. When the answer window appears, select Optimal to see if the Solver has found the optimal answer yet. You can also view all of the answers it has generated up to that point. If you like what you see, select Cancel to terminate the Solver; if not, select Solve, and the Solver will pick up where it left off.

Variations on a Scheme

Changing a constraint can dramatically affect the solution to your problem. Edit cell E21, the constraint for badger feed, to read +F6>=100. The Solver beeps, and the shaded area at the top of the Solver window flashes to warn you that a formula or input pertaining to your problem has changed since the last time you

solved the problem. As soon as you move from the worksheet back to the Solver's definition window, an error message repeats the warning.

Select OK to clear the error message, then select Solve from the definition window. When the Solver has completed the problem, the answer window indicates that the Solver has found only one answer. Select Optimal to see this answer in the worksheet.

The Solver indicates that under these constraints, the only possible solution is to produce 100 sacks of badger feed and nothing else. Range B10..E11 explains this result. Though this solution uses up only half the corn meal, oat bran, and sundried tomatoes on hand, it depletes the protein supplement. This product mix would be less than desirable for the company because the remaining inventory of other materials would go to waste. But with the specified constraints, it's the only solution.

Select Reset from the answer window to restore the original optimal solution. Edit cell E21 so that it reads +F6>=110 and clear the error message by selecting OK. Then select Solve from the definition window.

After only a few moments, the answer window appears and the Solver reports *No Answers Found. 1 attempts*. The gray Inconsistent option at the bottom of the answer window offers a clue. Select Answer to activate the Inconsistent option. The Solver reports that on its first attempt, it found an inconsistency in the problem.

What happened here? To find out, select Inconsistent from the answer window. The Solver pinpoints the trouble in cell E15—the constraint that ensures that the protein inventory is not exceeded. The minimum of 110 sacks of badger feed specified in cell E21 requires 4,400 pounds of protein supplement, which is more than the constraint in cell E15 allows. The Solver reports the inconsistency between these two constraints.

Select Cancel, then edit cell E21 to replace the current formula with the original formula, +F6>=0. Clear the error by selecting OK. Select Solve from the answer window to resolve the problem with its original constraints. Because you specified Options Number Answer All, the Solver will find all 11 answers without stopping.

Tabling the Ideas

The Solver gives you a full range of reporting options whenever its answer window is active. Among other things, the Solver's built-in reports tell you the differences between answers, what cells and constraints were used to solve the problem, and how much you can tinker with each adjustable cell and still satisfy all constraints.

For example, to see each answer the Solver has generated in tabular form, select Report Answer Table from the Solver's menu. Indicate OK or press Return to create an answer file. This command produces a table of variables and their values.

To make the table more readable, the Solver uses the range names and labels from your worksheet. For the optimal cell (cell H8), for example, the Solver displays the range name that you assigned the cell: *optimal*. If a cell used in the report doesn't have a range name, the Solver tries to find the label for that cell. It correctly identifies the adjustable cells in range F3..F6 as *Product Rabbit feed*, *Product Deer feed*, and so on, from the labels in range A3..A6 and cell G2.

Because the Solver uses the labels in your worksheet in this way, changing a label that pertains to your solution generates the error message *Problem may have changed—select Solve to refind answers*. If only the labels have changed, ignore and clear this error message.

When an answer table is active on the desktop, I-2-3/G's main menu is active, rather than the Solver's menu. You can print this table or save the file. For now, close the answer table by using the mouse or by holding down the Control key and pressing F4. Select No when I-2-3/G asks you if you want to save the table in a file.

Solving with Macros

Like any I-2-3 command, the Solver can be automated with macro commands. To run the Solver from the current file, use the following macro for the original four-product example:

```
'US-adjustable-constraint-optimal--
```

If you're experimenting with the parameters of a single problem—dropping or adding adjustable or constraint cells, for example, or specifying a different optimal

cell—a short macro such as the one above can quickly re-create your original problem. If you're not changing parameters, you probably won't need a macro to use the Solver repetitively. Once you've defined your problem, you can change formulas in your worksheet, including those in constraint and optimal cells, without respecifying ranges each time you solve. I-2-3/G saves the current parameters of the Solver's definition window when you save your worksheet.

A macro can also take advantage of I-2-3/G's @SOLVER function, which lets you monitor the Solver's progress while you do other things. The syntax of this function is @SOLVER(*query_string*), where *query_string* can be one of eight different arguments. For example, the formula @SOLVER("progress") tells you the percentage of the problem the Solver has completed, and the formula @SOLVER("optimal") returns 1 if the Solver has found the optimal answer.

If you want to run an iterative macro in a separate worksheet while the Solver is working in the background, add the following line of code to your macro to tell you when the Solver has found the optimal answer:

```
[IF @SOLVER("optimal")=1][BEEP]
```

Optimal Optimization

If you're new to optimization, don't expect things to go perfectly the first time you set up a problem. Despite the Solver's easy-to-follow menu structure and on-line help, defining a problem and interpreting the Solver's results aren't as intuitive as using @SUM. Fortunately, the Solver generally tells you—either directly with an error message or indirectly with interminable solving time or wildly incorrect answers—when your problem doesn't make sense. And by working through the sample Solver templates that come with I-2-3/G, you'll quickly grasp the rationale behind the technique. The following guidelines will speed you up the Solver learning curve.

Break large problems into smaller pieces. Theoretically, the Solver is limited only by the amount of RAM in your computer. But Lotus Development Corp. recommends that you use the Solver only on problems that have fewer than 1,000 formulas pertaining to the optimization.

Even a problem of this size would take a long time to solve.

Use range names rather than cell addresses to identify the adjustable cells, constraint cells, and optimal cells in the Solver's definition window. The cell addresses in the definition window aren't relative; they don't change if you move an adjustable, constraint, or optimal cell or if you delete or add a row or column in the worksheet. If you use range names, on the other hand, you can be certain that the Solver is always working with the correct cells.

Use inequalities as constraints whenever possible. Unless you're using an equality to express a relationship between two variables, there's probably a better way to structure a problem. For example, instead of defining *badger_feed* as an adjustable cell and using the formula *badger_feed*=50 as a constraint, enter 50 in *badger_feed*, erase the constraint, and redefine your problem so that *badger_feed* is no longer an adjustable cell.

The Solver is not compatible with some I-2-3/G @functions, such as the @D functions, string functions like @TRIM and @MID, and any @function containing a string argument. If formulas in the problem contain these functions, the Solver will not work. Likewise, logical operators such as #AND# are not allowed.

Also, try to keep the following @functions out of the problem you're solving: @CHOOSE, @IF, @INDEX, @HLOOKUP, and @VLOOKUP. Even though the Solver supports these functions, they can make the problem nearly insolvable.

Don't change any worksheet containing part of the problem while the Solver is working. The adjustable, constraint, and optimal cells in your Solver problem can span up to 15 open worksheet files. But if you change any of the Solver's source worksheets while the Solver is working, the process is immediately aborted and all answers are lost.

Finally, if the Solver seems to be taking an extraordinarily long time to produce answers, check the structure of your problem. Even if you have to change the problem and start the Solver from scratch, the time savings can be tremendous. "For a relatively small problem that's ill-conceived," warns Randy Ledbetter, a I-2-3/G user at IBM, "the Solver can go away and never come back." ▀

DEAD END

If your memory manager has no future under Windows, trade up to QEMM.

Windows 3.0 has driven most memory managers to the junkyard.

But not ours.

QEMM 386 v5.1 to the rescue

They said it couldn't be done, but we've updated our QEMM 386 (Quarterdeck Expanded Memory Manager) to run with Windows 3.0's real, standard and enhanced modes.

QEMM 386 v5.1 works with the built-in capabilities of your 80386, 386SX or i486 processor to give you the expanded, extended and high memory your programs need.

One of QEMM 386's most popular features is its high memory management. As you can see in the chart, there are gaps in your PC's high memory (the memory between 640K and 1MB). QEMM 386 finds these idle gaps (on some PCs as much as 130K) and fills them with memory—so you can load TSRs, drivers and parts of DOS there. The result is more memory below 640K for memory-hungry programs; space for larger spreadsheets and data bases.

Windows 3.0 in its standard and enhanced modes didn't let you take advantage of these high memory gaps. QEMM 386 v5.1 gives you back these capabilities.

QEMM 386 System Requirements: 80386, 386SX and i486-based PCs and PS/3s and PCs with 80386 add-in boards.
Operating system: PC DOS 2.04.0, MS DOS 2.04.0, Windows 3.0. Conventional memory requirement 1.7K.
Trademark: Windows: Microsoft Corporation 80386, 386SX and i486: Intel Corporation

©1990 Quarterdeck Office Systems

Insufficient memory to run application:

close one or more applications to increase available memory and try again.

When Windows 3.0 says there's not enough room to run your DOS programs, it's just trying to tell you it needs QEMM 5.1.

QEMM 386 has many more features. For example, there's *Optimize* to assist you in loading programs in high memory. And there's *VidRAM* that lets you use the EGA/VGA (as much as 96K) video area when you aren't running graphics.

Trade in your old memory manager for QEMM 5.1

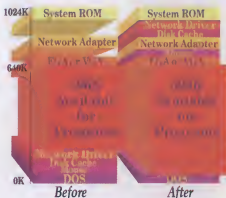
We're providing a second chance for users who picked the wrong memory manager.

We'll include you in our upgrade offer to QEMM 386 v5.1.

Whether you purchased your memory manager or it came with the computer you bought, we'll accept the cover of your user

manual as proof of ownership. Just send it to us with your upgrade payment, and we'll rush you QEMM—the memory manager that sets industry standards.

Quarterdeck is committed to helping you get the most out of the hardware and software you own today. And tomorrow.



QEMM finds the pockets of unused memory in your PC and makes them available.

Yes! I'm trading up to QEMM!

Payment method ☐ check ☐ Visa

☐ MasterCard ☐ American Express

Expiration

Card #

Name

Address

City

State

Zip

Please allow 3 weeks for delivery

Qty	Product	5-1/2	3-1/2	Each	Totals
	QEMM 386 5.1			\$99.95	
	Upgrade QEMM v5.0 to v5.1*			\$20.00	
	Upgrade QEMM v4.x to v5.1**			\$40.00	
	Upgrade other to v5.1*** (with proof of ownership)			\$45.00	
Shipping & handling \$5 in USA/varies outside USA					
California residents add 6.75%					

*If you purchased QEMM 386 5.0 on or after June 19, 1990, you are eligible to receive this upgrade free of charge. Simply send proof of purchase with your registration card to registered owners only.

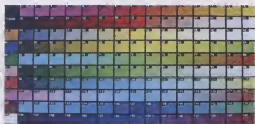
**Enclose the original cover of your current memory manager (users manuals) in order to get this special price. Offer expires 12/31/1990. For this upgrade offer, Windows 3.0 is not considered to be a memory manager.

Quarterdeck

Quarterdeck Office Systems, 150 Pico Blvd., Santa Monica, CA 90405 (213) 392-9851 Fax: (213) 399-3802

CIRCLE 112 ON READER SERVICE CARD

A palette of 324
dazzling colors—
more than any
other spreadsheet
—to make your
graphics as
powerful as
your words.

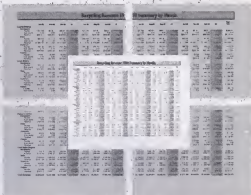


Commitment for 1994 (in millions)

Q4	1989
2,415,407	6,886,910
1,987,897	5,573,029
1,331,601	3,789,665
5,734,905	16,249,604
3,618,029	12,880,958

Our Graph Editor lets you add
freehand drawings or symbols to
call attention to critical data.

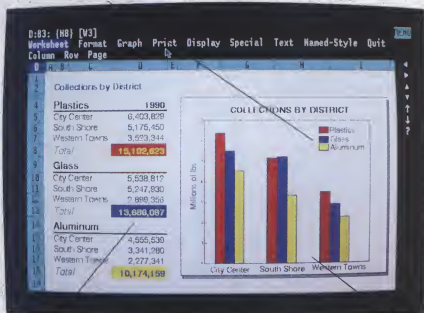
Create drop shadows,
borders and legends.



Only Release 3.1 offers an auto-compress feature that
quickly reduces larger worksheets so they print on a
single page.



Use a mouse or the keyboard.
It's up to you.



Combine a variety
of colors, type styles
and formats.

The WYSIWYG world of Release 3.1, with
its Impress technology, means what you
see on screen is exactly what you get
when you print your work.

Display "live" graphs,
anywhere on the
spreadsheet.

Think Graphically. Think An

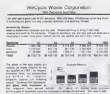
Welcome to the world of Lotus 1-2-3
Release 3.1. Where you'll immediately
discover the ease-of-use of a graphical
environment, complete with mouse sup-
port and full WYSIWYG display. In fact,
Release 3.1 gives you so many creative
options, you'll actually find using it fun.

Of course, you'll also find all the
powerful analytical features that have
made Lotus 1-2-3 the best-selling spread-
sheet in the world. Like our unique 3D
technology and access to external
databases.

But it doesn't end there. Because

Release 3.1 also delivers the most
impressive output imaginable. Along
with the widest range of spreadsheet for-
matting options available. Which means
you have complete control over how you
want your work to look.

And even more importantly, we've



With Release 3.1 your output looks great in black and white.

Choose from 8 combinations of Bitstream® typefaces which you can scale from 3 to 72 points.

Align titles or text—left, right, even or center—with one simple command.

WeCycle Waste Corporation

1990 Recycling Summary

Last year was a good year for the company. WeCycle was profitable and came very close to achieving our goal in a very uncertain economic and recycling climate.

Revenue by Product

Material collections increased over the year. Plastics continue to bring in the most revenue and profit for the company. Prices for aluminum are still very soft and while we're continuing to collect more glass, markets for the raw material are still in their infancy.

Revenue	Q1	Q2	Q3	Q4	1990
Plastics	1,890,785	1,982,024	2,378,397	2,836,983	9,088,189
Glass	1,700,504	1,882,159	1,869,430	2,600,884	8,032,753
Aluminum	1,146,984	1,182,022	1,489,421	1,501,783	5,420,090
Total	\$4,738,173	\$5,026,180	\$5,737,248	\$7,089,430	\$22,541,032

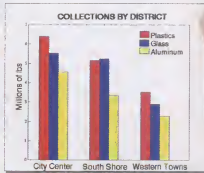
The graph at the right details our revenue by waste material for the four quarters of 1990. The revenue increases show that communities are building their recycling programs beyond just collecting plastics. Revenue from **aluminum** and **glass** have increased as their programs have gained volume.



But, we're still seeing price pressure as the supply of recyclable materials continues to exceed the demand. We need to look for ways to expand our markets and increase the use of recycled materials.

Collections by District

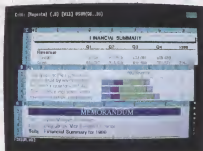
Plastics	1990
City Center	6,403,829
South Shore	5,175,450
Western Towns	3,523,344
Total	15,102,623
Glass	
City Center	5,538,812
South Shore	5,247,930
Western Towns	2,699,356
Total	13,486,097
Aluminum	
City Center	4,555,539
South Shore	3,341,280
Western Towns	2,277,341
Total	10,174,159



Only Release 3.1 automatically wraps text around a graph.



Release 3.1 runs in Windows 3.0. Just click the icon and you're on your way.



Our unique 3D technology. It's the best way to organize your work, link files, consolidate data, or create multi-page reports.

Mix bold, italics, underlines, colors and typefaces to create over 100 text style combinations—more than any other spreadsheet.

Over 200 graph style combinations that you can size and enhance. You can even display more than one graph per page.

analytically. Think Confidently.

designed Release 3.1 for PCs running either DOS or DOS with Windows™ 3.0.

Plus, when you purchase Release 3.1, you

Lotus 1-2-3



can count on the best and most comprehensive support in the business. Including six months of 24-hour, 7 days a week, toll-free help.*

So don't think twice. Think Lotus.

Call 1-800-TRADE UP, ext. 992, for upgrade information or for a free Release 3.1 demo disk. And be confident that you're buying the best spreadsheet in the world.

Introducing Lotus 1-2-3

3.1

*24 hour support available in U.S. only

THE BEST

SURVEY

OUR READERS' CHOICE AWARDS

Awards are as fashionable in the software industry as they are in Hollywood. And they can be nearly as entertaining. The "Best Database with Gray and Black Packaging" seems to be the computer industry's alternative to "Best Nighttime Sitcom Featuring Four Zany Women." Increase the number of awards and you're bound to make more people happy.

But when everyone's a winner, who's fooling whom?

That's why we asked you to select this year's *LOTUS* magazine Reader's Choice Awards. We wanted to know—from the field—which software products work for you and which don't. No holds barred. No pulling punches or hedging your criticism.

We all know there are favorite products, hotly discussed products, and products that have great visibility but no usability. What we sought, however, were the software packages that have enhanced your productivity to a significant degree, regardless of price or version number.

To find out, we asked 3,000 *LOTUS* readers to rate the software products they use, applying only one question to each: "On a scale of one to five, how much [has] each package enhanced your productivity?" We also asked for comments relating to productivity gains.

Answers came from a broad spectrum of *LOTUS* readers, though their job titles, job functions, and company sizes reflected the readership as a whole. CEOs and senior and middle managers constituted nearly 60% of the respondents. Almost half of you (42%) work in midsize companies, and the same number work in large companies with more than 1,000 employees. The remaining 15% are in small businesses. And while 14% of you are computer specialists, nearly half of you are

product users first and product evaluators second. Your jobs are mainstream business occupations: administration, finance, engineering, education, manufacturing, and R&D. As users of these programs, you're much more apt to call 'em as you see 'em. Labor consultant Jim McCauley of Ithaca, N.Y., called *WordPerfect* "the most overrated software—a terrible program to write with." Others disagreed, giving *WordPerfect* the highest rating of the entire survey.

Glen Shepard wrote to us from San Diego, saying that *dBase IV* "has consumed considerable resources and has yet to return anything." Return on investment—which includes both learning time and the cost of the product—seemed to strike a chord, with more of you telling us of your profits rather than losses. Over and over again, you told us that some packages are indispensable, that they save time, and most important, save money.

Reducing or containing costs seems much more important to *LOTUS* readers in small businesses than to those in larger companies. Bill Scribner, an executive with a small oil company in Cheyenne, Wyo., likes *WordPerfect* because it "reduced the need for a secretary." William Bernaski of the New York State Department of Environmental Conservation Commission, in Albany, said that *dBase III Plus* "replaced laborious, error-prone manual clerical functions with accurate and efficient procedures."

You measure the strength of these products by their capacity to make your job easier, by their ability to save money, and by how consistently they increase your productivity.

Here are the crème de la crème of micro-computer software products, winners because they meet the only measure that makes sense: These products make it easier to do real work in the real world.

ACCOUNTING

QUICKEN

Intuit's \$59.95 *Quicken* played David to a field of Goliaths to win first prize in the accounting field. *Quicken* started out life squarely as a check-writing and personal-finance product, but upgrades pushed it into more professional applications. All the while it kept the intuitive interface that users love. Conceding that the package isn't suited for balancing the books of the Fortune 500, readers were nevertheless nearly unanimous in their assessment of *Quicken* as all a small business needs to manage its records.

There's "no question" that *Quicken* can handle tasks bigger than those for which it was originally intended, says Andrea Dugan, vice president of 123 Accounting Services, an accounting consultancy in Herndon, Va. "It can definitely handle account spreads and some of the larger tasks that a small company needs," she added.

Simona Bihl, assistant recorder for Solano County, Calif., uses *Quicken* to keep the books for a real estate business she operates on weekends. "*Quicken* allows me to know at any point the status of my financial investments. And keeping records of expenses by categories helps me save money," she says.

Bihl's next goal? To introduce *Quicken* to her office. "Well, we can't use it for the whole county," she acknowledged, "but I can certainly use it to track the accounts payable and receivable inside my department."

COMMUNICATIONS

PROCOMM PLUS

Once a \$50 shareware program, the original *Procomm* was updated in 1988 to become a full-blown commercial package, and its popularity increased dramatically. No wonder. It had all the bells and whistles of its higher-priced competitors, and it cost less. *Procomm Plus*, the beefed-up, \$119 commercial version, remains in the economy class but includes nearly twice the original's scripting commands, more file transfer protocols, and an improved user interface that has a full complement of pull-down menus. The law firm Grunfield,

Desiderio, Lebowitz & Silverman, in New York City, chose the package because, says Grunfield CFO Stanley Cohen, "the price was low."

DATABASES (FLAT-FILE)

Q&A

Combine a word processor, a database, and a "natural language" user interface and you have Q&A.

Released in 1988 to broad acclaim, Q&A makes it possible for database novices to find the data they need when they need it. Enter a command such as "Show all customers with balances greater than \$500 and no overdue invoices" and, with a little training, Q&A will display just that. Switch to the word processor and you can write a letter to the overdue customers. A few more keystrokes and you can

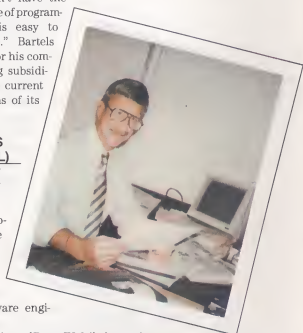
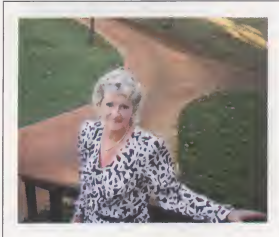
print letters addressed to each customer that matched your database query. Jerry Bartels, controller of holding company L.B. Industries in Boise, Idaho, says, "I don't have the time for the minutiae of programming, and Q&A is easy to maintain and use." Bartels uses Q&A to monitor his company's truck-leasing subsidiary by tracking the current and future locations of its vehicles.

DATABASES (RELATIONAL)

dBASE III PLUS

One of the first micro-computer database programs, Ashton-Tate Corp.'s *dBase* made its debut in 1979 as *Vulcan*, the brainchild of software engineer Wayne Ratliff.

Its 1989 incarnation, *dBase IV*, failed to gain a place in users' hearts because it was riddled with glitches and bugs. Users stayed put and happy with the earlier *dBase III Plus*. A no-nonsense upgrade



SURVEY

The bottom line counts: Assistant County Recorder Simona Bihl (left) uses *Quicken* to closely track her financial investments; CFO Stanley Cohen (below) chose *Procomm* because "the price was low."

THE BEST

SURVEY

If one is good, two must be better: revenue analyst Kathy Greenberg (right) uses both *Norton Utilities* and *Magellan*; engineer Roger Daoust (below) uses the ante by relying on three separate utility packages.

to *dBase II*, *dBase III Plus* included pull-down menus that allowed users to dispense with the infamous and intimidating *dBase II* "dot prompt." *dBase III Plus* became an invaluable tool for companies that needed a powerful desktop database program.

Roger Schamp, controller of Christie Electric Corp. in Gardena, Calif., downloads transaction databases from a Unisys mainframe into *dBase III Plus*. He needs to print invoices but can't do it from the transaction program. Using *dBase III Plus* and Concentric Data Systems' *R&R Report Writer*, Schamp is able to keep tighter control on the monthly books, which, he says, "I wouldn't be able to do in any other fashion."

dBase IV version 1.1 is regaining some of the interest lost by *dBase IV*, but *dBase III Plus* remains the database of choice for *LOTUS* readers.

and *Magellan* but raved about the autodialer in *PC Tools Deluxe*. According to Conrail's Per Madsen, "PC Tools is the best for disk management; *Norton Utilities Advanced* is best for dealing with disk and file problems."

Apparently, rescuing files is more important to *LOTUS* readers than organizing them. That need gave *Norton* the edge. "*Norton Utilities Advanced* saved several key erased files and restored some severe hard-disk problems," reported J. C. Kaufman, a research manager with Armstrong World Industries in Lancaster, Pa. David L. Dahl, a statistician with the quality assurance department

at Outlook Graphics in Neenah, Wis., had a similar story: "*Norton Utilities Advanced* saved us thousands of dollars that would have been spent for data reentry and hard-disk fixes."

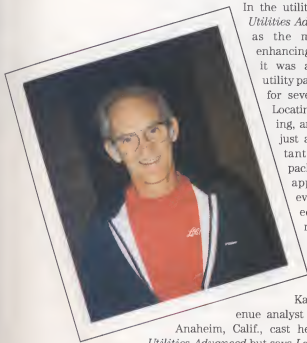


UTILITY

NORTON UTILITIES ADVANCED

In the utility category, *Norton Utilities Advanced* got the nod as the most productivity-enhancing package. However, it was a close race. Most utility packages contain tools for several types of tasks. Locating, restoring, organizing, and viewing files are just a few of the important attributes these packages bring to our applications. Nearly everyone who responded to our survey uses more than one package—each, presumably, for what it does best.

For example, Kathy Greenberg, a revenue analyst for Pacific Bell, in Anaheim, Calif., cast her vote for *Norton Utilities Advanced* but says *Lotus Magellan* is the biggest timesaver when it comes to finding files. Roger Daoust, an engineer with the City of Chula Vista, Calif., also uses *Norton Utilities Advanced*



GRAPHICS

HARVARD GRAPHICS

Lotus Freelance Plus and *Harvard Graphics* from Software Publishing Corp. in Mountain View, Calif., are traditional close finishers when it comes to software reviews. In recent reviews and buyers' guides, there isn't more than a decimal point or two of ratings separating the two programs.

Ask users what they think, however, and *Harvard Graphics* takes the blue ribbon. According to the Gallup Software Poll, 43% of Fortune 1,000 businesses use *Harvard Graphics*; 29% use *Freelance*. Roughly similar percentages—47% and 23%, respectively—showed up in our sample, so it's no surprise that *Harvard Graphics* edged out *Freelance Plus* among *LOTUS* readers.

More people are starting to realize the importance of clear, well-organized, easy to understand business information. And most readers agreed with Robert B. Jenkins, an epidemiologist with the Veterans Administration Medical Center in Gainesville, Fla.: "*Harvard Graphics* [helps produce] better-understood presentations and reports and provides visual feedback to workers."

A few readers were more lavish in their praise of *Harvard Graphics*. "My career depends on it!" raved Evan Morris, an insurance-marketing specialist with David L. Cannard, CLU & Associates in Vancouver, Wash.

LAN OPERATING SYSTEM ADVANCED NETWORK

Someone may want to tell networking companies that the much-touted LAN revolution hasn't exactly produced legions of happy customers. Readers awarded more bottom-of-the-barrel "productivity not enhanced" ratings in the LAN OS category than in any other that *LOTUS* surveyed. Perhaps the LAN isn't yet everything it's promised to be.

All the news wasn't grim, however. Some readers were happy with their networks—provided they were running Novell's omnipresent *NetWare*. Despite inroads from OS/2 and other players, Novell still enjoys a 60% share of the LAN market, which readers said was significant when it came time to make networking decisions.

When Bart Reubenson went looking for a LAN, he asked himself, "Who's going to be there five years from now?" After evaluating the competition, Reubenson, controller for the CO-28 chain of San Francisco Bay area hotels, chose to go with *NetWare* because of Novell's reputation and hold on the market. "There's got to be some reason why Novell is the best," he reasoned.

David DeSantis, information systems director for Detail Associates in Englewood, N.J., is equally happy with his decision to buy *NetWare*. DeSantis believes that employee productivity at Detail, an environmental consulting firm, has increased dramatically since he replaced its sneakernet system with *NetWare*. "General office expenses and overtime costs have dropped, as well," he reported.

PERSONAL FINANCE QUICKEN 2

Intuit Inc.'s *Quicken 2* won an easy victory over Andrew Tobias's popular *Managing Your Money*, thanks to a readership whose number-one priority apparently is ease of use.

"*Quicken's* simplicity is what makes it work," says accountant Dugan. She explains that the program is flexible enough to keep tabs on relatively complex financial books but isn't needlessly complicated.

The check-writing/personal finance software walks users through the processes of writing and

printing checks, categorizing expenses, reconciling accounts, performing basic record-keeping tasks, and producing financial reports.

Quicken 3, a July 1989 upgrade, takes the program farther into the small-business realm by offering additional types of accounts and more complete reporting options. *Quicken's* basic input

screen, which takes the form of a blank check that users fill out electronically, is a "stroke of genius," Dugan says. "People who want to use it aren't necessarily accountants," she adds, "but everybody's seen a blank check before, haven't they?"

TAX PREPARATION TURBOTAX

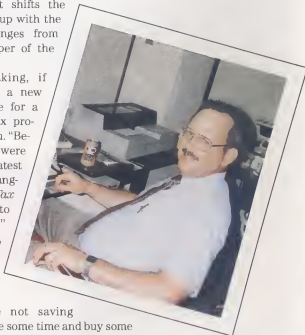
Filling out tax returns

is high on nearly everyone's list of most-hated activities. To ease the annual headache and avoid costly errors, many people use a tax-preparation package. The package most used and best liked among *LOTUS* readers was *TurboTax* from Chipsoft in San Diego, Calif.

One advantage of using a tax package is that it shifts the burden of keeping up with the latest tax-law changes from you to the developer of the software package.

Generally speaking, if you're eligible for a new tax break or liable for a new tax bite, a tax program should tell you. "Before the deductions were reduced [in the latest round of tax-law changes], I figure *TurboTax* saved me \$1,000 to \$1,500 per year," says Per I. Madsen, manager of operations improvement for Conrail, in Philadelphia.

Even if you're not saving money, you can save some time and buy some peace of mind. As Simona Bihl, the county recorder, put it: "*TurboTax* helps me, a procrastinator, meet IRS deadlines accurately and efficiently. A great program!"



THE BEST

SURVEY

Peace of mind:
controller Bart
Reubenson (left)
trusts Novell's
market reputation;
Operations
Improvement
Manager Per
Madsen (below)
relies on *TurboTax*
to keep up with
the latest tax-law
changes.

THE BEST

SURVEY

Spreading the word: *RightWriter* helps import/export manager Michael Hayes (right) "get the message across"; nursery president Terry Sjuln (below) believes *RightWriter* has made him a better writer.

DESKTOP PUBLISHING ALDUS PAGEMAKER

The *PageMaker* vs. *Ventura Publisher* debate has been going on since desktop publishing migrated to the PC from the Macintosh. Sure, there are other programs out there, but they're out there the way Pluto is out there—small, far away, and not particularly compelling. If you're serious about desktop publishing with a DOS-based PC, you're using either *PageMaker* or *Ventura* and, judging from readership responses, you're fiercely loyal to your program of choice. It was neck and neck, but Aldus's *PageMaker* won by a nose.

It is likely that *PageMaker*'s flexibility for shorter documents gave it a boost over *Ventura*. "We don't really do long books, which is what *Ventura* is better for," says Ann Elbirt, marketing administrator for Advanced Institutional Management Software (AIMS) Inc. in Syosett, N.Y. "Each piece I produce is different, and *PageMaker* offers me the flexibility I need for each job," she says.

Flexibility also topped the list for Bill Johnston, an operations analyst at the New York Central Mutual Fire Insurance Co. in Edmeston, N.Y. "With *PageMaker*, people are able to experiment with design changes," he says, explaining that the company's operations department produces in-house newsletters and bulletins and likes to vary the presentation of each project.

Since moving to Microsoft Windows 3.0 and *PageMaker* for Windows, finished products are delivered more quickly, virtually error free, and at a much reduced expense, he says.

WORD PROCESSING WORDPERFECT

WordPerfect, arguably the most powerful of all word processors, consistently beats the competition in versatility, capability, and features. If it can

be done on a word processor, *WordPerfect* can do it. 1-2-3 worksheet tables can be dumped, column widths and all, directly into *WordPerfect* documents. Desktop-publishing features make it appealing to those who produce more than memos.

Fred Born, a contract specialist with the Resolution Trust Corp. (RTC) in Dallas makes constant use of *WordPerfect* since the agency's Washington headquarters standardized on the word processor. Born took RTC's original solicitation of services forms, a six-inch thick stack of documents, and "modified them to conform to our needs." With RTC gearing up to deal with the savings-and-loan trouble in Texas, Born says his staff had to become familiar with *WordPerfect* "or we'd never get the word done."

WORD-PROCESSING UTILITY

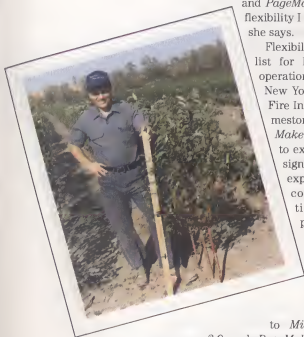
RIGHTWRITER

Afraid your writing style is too dense? Not sure when to use the subjunctive? Grammar and style checkers can help you out.

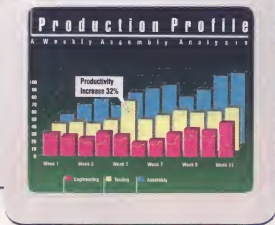
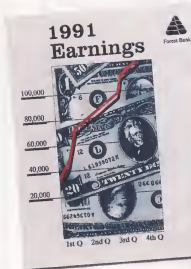
RightWriter from Que Software is a grammar and style-checking program that compares your documents against a catalog of grammar rules. It also includes a spelling checker with 45,000 words. The combination can produce a document that would pass muster with any English teacher.

It would also pass the test of any foreign trade council. Michael Hayes, overseeing import/export operations for Utica Cutlery Co. of Utica, N.Y., uses *RightWriter* to "better get our message across."

RightWriter can be tailored to check for five writing styles—business, technical, manual, proposal, or fiction—at three educational levels: general public, high school, and college. Terry Sjuln, president of Sjuln Nurseries in Hamburg, Iowa, says that by using *RightWriter* he has become a better writer by "anticipating the things it's going to correct." ■



Applause.



Bravos. Cheers. Hurrahs.

We found APPLAUSE II to be easier to work with than either Harvard Graphics or Freelance Plus, and faster than the Windows-based products.

INFOWORLD
JUNE 11, 1990

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PC MAGAZINE MARCH 13, 1990

PC/COMPUTING APRIL 1, 1990

It's graphical. It's interactive. It makes excellent use of the mouse. Best of all, it abandons the stodgy fill-in-the-form approach to creating charts that is used by Freelance, Harvard and 35mm Express.

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INTRODUCING ACT 1 PLUS

(We had a tough ACT to follow, and follow if we did)

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Cougar Mountain Software is pleased to introduce a total restructuring of our pricing and packaging policy that we believe establishes our accounting software as the best totally integrated, totally upgradeable single user package in the industry. **ACT 1 PLUS** is the accounting software by which other accounting software is judged. No other accounting software retailing for under \$500.00 is as powerful, flexible, and comprehensive as **ACT 1** and no one has a better eight year track record for reliability.



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NEW

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NEW

User's Manual

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SOFTWARE FOR THE '90s



We admit it. Rather than rely on purportedly "objective" criteria to pick the key new software of the year, *LOTUS* took a subjective approach. Sales receipts may seem a rational way to measure importance, but marketing campaigns can initially turn a turkey into a swan. Press clippings are another indicator, but the proper perspective may fall victim to deadlines and the bandwagon effect. We chose a less quantitative but more meaningful criterion to measure the software of 1990: impact.

What is impact? We define it as the significance of a product beyond its immediate appeal, sales records, or performance. It's the influence a product has on the way we work. That influence may be seen in changes made to other products, as developers react to a program's effect. Most important, perhaps, impact is the way a product can change our expectations about the ability of software to improve our situation.

We coupled our own reflections with those of leading software analysts and users to compile *LOTUS*'s Top Ten Best New Programs of 1990. Each of these products was released in 1990, but all are products for the nineties.

For impact, nothing can touch Microsoft's third edition of *Windows*. This version of Microsoft's graphical environment for DOS

finally delivered on its promises and breathed new life into an operating system on which tens of millions of users still depend. More than 25,000 copies per month flew out of computer stores during the summer, according to retail store surveys by Audits and Surveys. The spark from *Windows 3.0* lit a fire under developers, who are creating a rapidly broadening spectrum of *Windows* applications. In fact, any of a half dozen or so *Windows* applications, including Microsoft's *Project for Windows* and Micrografx's *Charisma*, might easily have made the list simply because they so fully and functionally exploit the graphical environment.

Consensus about the impact of the other products on our list is hard to reach, partly because half of them had just shipped or were about to ship as we went to press. The lack of consensus is also due to the fact that some of these programs are ahead of their time. *Lotus Notes*, for example, leads the groupware charge, but it may be years before many companies have the network infrastructure to take advantage of it. The same is true of Microsoft's *SQL Server* for database access and AT&T's *Rhapsody* for network information management. But that trio of products makes it clear that 1990 will be remembered as much for linking as for windowing.

•
These
programs will
have the
biggest
impact on
the way we
work in the
future.
•

THE BEST

'90s

WINDOWS 3.0

(Microsoft Corp.) After languishing for five years, how could *Windows* become such an "overnight" success in its third release? Try this recipe: Start with generous helpings of usable memory beyond 640K, toss in plausible multitasking and support for character-based programs, adorn with pretty pictures and colors, and feed to a clientele that's hungry for new productivity tools but not ready to abandon familiar DOS applications.

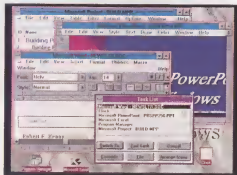
For all its attractions, the big impact of *Windows* is not the product itself but its offspring—graphical applications that are more intuitive, versatile, and integrated than their ancestors. Many such programs followed in the immediate wake of *Windows* 3.0. Others, including new versions of heavyweights such as *1-2-3*, *Paradox*, and *WordPerfect*, are just around the corner. *Windows* also clearly paves the way for OS/2 and its nearly identical Presentation Manager interface, though the timing of the transition is debatable.

In the meantime, many businesses like what they see in *Windows* 3.0, and the platform is fast becoming a corporate standard. "It's everything I expected it to be, and maybe a little more," says Cheryl Currid, director of information technology at Coca-Cola Foods in Houston. "It's not perfect, but it certainly has laid the foundation for a lot of good things to come."

TOOLBOOK

(Asymetrix Corp.) Much has been said and written about "personal programming" tools since Hyper-

Card debuted on the Macintosh several years ago. In the PC arena, however, most attempts at create-it-yourself packages lacked the simplicity, versatility, and standard graphical platform to lure nonprogrammers. *ToolBook*, the "software construction set" for *Windows* 3.0, has all three



Windows 3.0 brings an appealing combination of extra memory, decent multitasking, and colorful pictures to your applications.

qualities—if not yet the speed to make it practical for all tasks.

ToolBook lets almost any user create programs by painting the screen, arranging "objects" that perform predefined functions, and exchanging data with other *Windows* applications. You can link your data with hypertext hot buttons to color graphics and even animated sequences, all without speaking a computer language such as C or Assembler. That opens the door not only for building your own applications but for remodeling the ones you already have into a more coherent whole.

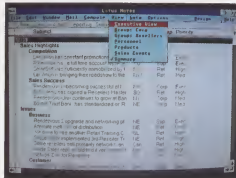
"It's going to get harder and harder to see the boundaries between commercial software and corporate- or user-produced software, particularly within *Windows*," observes Paul Grayson, chairman of Micrografix, an early

Windows developer. "Commercial software will become more of a starting point than a finishing point."

LOTUS NOTES

(Lotus Development Corp.) "Paperless office" and "electronic conferencing" are terms that have long represented a sort of nirvana for the information age. But the automated office of the 1980s, with its networked PCs and laser printers, actually produced more paper and more meetings. The dream of tidy, efficient electronic communication seems to be slipping further into fantasy. *Notes* is the first practical small step toward successfully moving bytes around the office instead of paper.

Notes, the ground-breaking groupware product that enables network users to communicate without ink, ribbon, or toner, is a working vision of the truly electronic office and a harbinger of good things to come. *Notes* is essentially one part electronic mail and one part database, though that description does not



Part electronic mail and part database, Lotus Notes can move a work group a step closer toward a "paperless office."

do justice to the magic it can work when customized for a particular set of group dynamics. Not only can it replace memos and telephone messages, it also has the potential to smoothly handle the logistics of team efforts, from ad hoc brainstorming

PHOTOGRAPH BY SUZIE COHEN

Lotus Notes



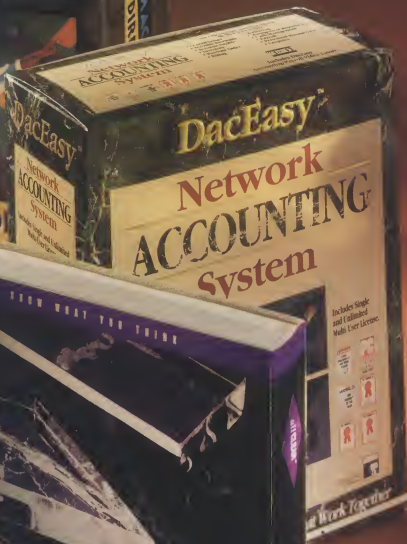
TOOLBOOK

Appendixes
Getting Started
Getting OpenOffice
Getting the Book

Microsoft Windows

Microsoft Windows





to formal project management.

"The ability to get timely, accurate information to the right people is crucial in any operation, and *Notes* lets you do that," says Peter Chen, a senior manager in the technology group at the Chicago headquarters of accounting firm Arthur Andersen. "Before *Notes*, if you weren't around to attend a meeting, you didn't know what was going on. Now, people can get what they need to know and add their own comments to the process when they have the time to do it." (For more on *Notes*, see page 62 of the September issue.)

DIRECTOR 2.0

(MacroMind) If animation can make Bart Simpson and Roger Rabbit household names, imagine what it can do for business presentations. But even though "multimedia" may be on everyone's lips, it's on few desktops. This year marked an important turning point for multimedia tools, however, and the leader was MacroMind, with its *Director 2.0* animation program and complementary products.

Director 2.0 for the Macintosh adds a new air of sophistication to 2-D animation. It offers interactive scripts, 24-bit color images, and connections to external

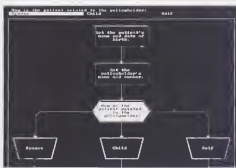
supporting cast: MacroMind's Accelerator speeds and smooths existing animations, its Three-D add-in handles 3-D imaging, and its MediaMaker melds graphics, video, and sound into a finished (if still amateur-quality) video. There are no DOS versions yet, but with a strong Windows platform, *Director* will be coming soon to a PC near you. Meanwhile, MacroMind's *Windows Player* will let you view Mac-created productions.

"No single program can turn your workstation into a multimedia production center, but *Director* has really established itself as a multimedia standard," notes David Baron, who follows multimedia developments for Seybold Publications. "If you had to start in one place, MacroMind would be the place to go."

DACEASY NETWORK ACCOUNTING

(DacEasy) Accounting packages seldom raise eyebrows, much less open eyes to the future. But the network edition of DacEasy's popular accounting system includes something other packages don't—the network. For \$699, you get *DacEasy Network Accounting* plus Moses Computer's *Chosen-LAN*, an easy to install, peer-to-peer local area network. The accounting software is a full-fledged 11-module, file-sharing program. The network boards, oper-

ating-system software, and telephone wire are enough to set up a five-user LAN. You need only a screwdriver and an hour or two to install the LAN. If you already



AII Clear translates the skeleton information of outlines and timelines into a third dimension: flow lines.

have a network, you can buy the software alone for \$499.

By itself, *Network Accounting* may not substantially change the face of small-business computing. But it is the first of what will probably be many high-profile efforts to address the network needs of the legions of forgotten little guys that represent the fastest growing segment of the PC market, according to research firm BIS CAP, International.

"There are an awful lot of small businesses out there that are ready to network," says Raymond Boggs, BIS CAP's director of small-business research. "And this approach could have enormous appeal."

ALLCLEAR

(Clear Software) Just try to add a conditional statement like, "If Northeast sales are better than expected, we'll kill the promotion budget there and pour our resources into the Southwest region..." to an outline or a project-management timeline. Chaos ensues. That's because outlines and timelines are one-dimensional and linear, which is not the way human beings move from point A to point B.

Date	Description	Debit	Credit
1/1/82	Initial Balance	15.75	
Total		15.75	15.75

The network edition of DacEasy's accounting package comes with its own network.

devices such as laser-disc and CD-ROM players. It also has a



'90s

DacEasy Network Accounting is the first program that addresses the needs of the legions of forgotten small-business people.

THE BEST

'90s

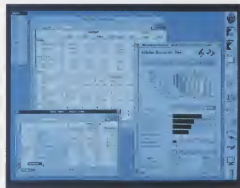
AllClear recognizes this and uses various forms of flowcharts to graphically depict branches and relationships from the documents, outlines, or spreadsheets that you feed it. It's a simple yet surprisingly powerful tool that can turn the verbally dense into the visually transparent.

"*AllClear* presents information in a way the human brain readily understands," explains Jeffrey Tartar, editor of *Softletter*. "It's a very powerful metaphor for the way we interact with computers, and it's something we'll probably see a lot more of."

LOTUS IMPROV

(Lotus Development Corp.) One of the truly wonderful things about the spreadsheet format is its open-endedness. The row-and-column matrix offers seemingly limitless possibilities. But this open-endedness has a down side: It directs a good deal of your attention to the workings of the format itself and away from the information it contains.

Improv for the Next system proves there's more than one way to wield numbers by focusing squarely on content rather than form. The program has no names or formulas tied to single cells or macros. Instead, you



With *Lotus Improv* you can spend less time building models and more time manipulating your data.

define, in English, the characteristics and rules that govern

cells, groups, and categories. Formulas and formats are inserted in a settings window and stored apart from the worksheet itself so you can apply them wherever and whenever needed. And *Improv* fully exploits the graphical nature of the Next machine. The net effect is a spreadsheet that puts mechanics in the background and pushes meaning to the fore. Simply put, *Improv* offers a new way to view your data.

"Like many spreadsheet users, I don't spend a heck of a lot of time building complex models," says Richard Shaffer, editor and publisher of the *Technologic Computer Letter*. "I spend my time fooling with data, and that's what *Improv* is so good at."

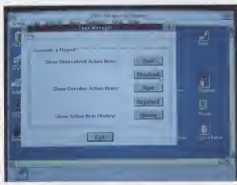
When we'll see *Improv*, or at least its concepts, move onto other platforms is anybody's guess. But already it seems only a question of when, not if.

RHAPSODY

(AT&T) As PCs grow more powerful and applications more sophisticated, departmental networks become commonplace. But is anyone looking at the bigger picture in office automation? The truth of the matter is that lots of folks are. IBM has *OfficeVision*, Digital has *All-in-I*, and Hewlett-Packard has *NewWave Office*—to drop a few prominent names.

But AT&T's *Rhapsody* stands apart. *Rhapsody* is an office integration system that runs on client-server networks. At the

front end or workstation, *Rhapsody*'s graphical interface, based on *Windows* and *NewWave*, runs all the standard DOS applications, graphical or character. Eventually, the same environment will extend to the OS/2 Presentation



Rhapsody makes it easy to organize the collection, assembly, and distribution of work over a network.

Manager. On Unix workstations, it will work with *Open Look* or *Motif*. At the back end or network server is an AT&T version of LAN Manager running under Unix.

Rhapsody's virtuosity lies in managing the way data moves among users. The program provides software tools to logically organize the flow of work over a network—collecting information from certain users and assembling it into a database report, then dispersing it to other team members on the network, for example. *Rhapsody* can even re-route work, depending on its content or according to a person's travel schedules.

"*Rhapsody* is a development tool that understands that groups are made up of individuals... who have different needs, schedules, and responsibilities," observes Esther Dyson, editor and publisher of *Release 1.0*, a newsletter that tracks computer trends. "It manages the process with an eye toward the people in it."

Whether AT&T can sell its vision to a wary marketplace is another question, but *Rhapsody* makes important strides in stressing meaningful connections.



Microsoft SQL Server

Microsoft
SQL Server
Database Server for PC Networks



AT&T

AT&T R

Quarterdeck
expanded memory
manager
386

The
for
power
and
flexibility

Colius
mm

Impro

The latest
in
power
and
flexibility



(Microsoft Corp.) At the heart of virtually all local area networks is the shared database—the accounting records, parts inventories, and personnel files that

That kind of widespread base makes it possible for customers to fulfill their network database needs without becoming tied to

ing tool that links *Microsoft Excel* and other *Windows* applications to *SQL Server*.

"Right now, we've got a lot of *dBase* data and applications," explains Ernest Pages, office systems manager at Ryder System Inc., in Miami. "In the interim, we're looking at *Windows* front-ends to *dBase*, but *SQL Server* is where we want to be eventually."

QEMM
386 5.1

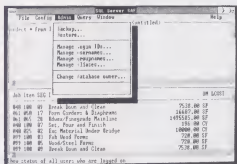
(Quarterdeck Office Systems) Because you can't see it, hear it, or touch it, most people assume they have little or no control over their computer's memory—which suits many people fine. That complacency is well enough for most, but then again, so did

Today, managing the conventional, expanded, and extended memory in your computer is critical if you want to run the latest DOS and *Windows* soft-

ware effectively. *Quarterdeck's Expanded Memory Manager (QEMM) 386 5.1* is emblematic of a new breed of RAM-management utilities that can help you juggle your computer's memory efficiently.

This release is particularly noteworthy because it not only lets you put RAM-resident programs or drivers into "high" memory (640K to 1 megabyte) to conserve conventional memory, but it lets you do so while running *Windows* 3.0 full-throttle on a '386 machine, a combination that otherwise wouldn't work. The result is ample room to use standard DOS applications and pop-ups within *Windows*.

QEMM 386 1.2 can also deal with DOS extenders, including the one used in I-2/3 Release 3. Adding a module called *Manifest* improves its memory analysis and reporting. In short, what *Norton Utilities* and *PC Tools* did for hard-disk management, **QEMM 386** and an increasing number of worthy competitors (such as Qualitas's *386-Max*) do for memory management.



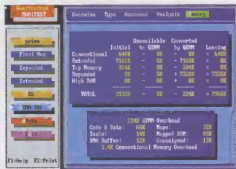
■ **Broad support** by applications allows SQL Server to bring harmony to the shared database.

must reside safely in one place but be seen in many. Database management systems designed for the desktop and adapted for network use aren't always up to the job, and the increasing number of people and applications needing access to the central database makes standardizing difficult.

Microsoft's *SQL Server*, developed jointly with Sybase, promises to bring broader access and greater harmony to the shared database. *SQL Server* is a high-performance database management system for client-server networks running under OS/2 (using the LAN Manager network operating system, for example). A broad array of client or front-end applications running under DOS, *Windows*, or OS/2 can access the central database server, which provides superior speed and security.

Version 1.1 of *SQL Server* added several features and performance improvements, but none as important as the impressive and growing list of supporters. Ashton-Tate, Sybase, Database, Blyth, and Revelation are selling *SQL Server* along with their database products, while

Microsoft's SQL Server promises to bring broader access and greater harmony to the shared database.



■ **Quarterdeck's Manifest** tells you how your memory is allocated.

"QEMM 386 5.1 is the answer to a lot of prayers," says Steve Gibson, a noted industry columnist and analyst and author of *Spinwrite II*, a hard-disk utility program. "It gives you a level of control over memory use that's unprecedented." ■

—Christopher O'Malley

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THE MOST POPULAR 1.2.3 ADD-INS



ADD-INS

One of 1-2-3's most endearing qualities is that its rows and columns are an open invitation to innovation. And the guests, in the form of 1-2-3 enhancement products, keep right on coming.

There are about 1,000 add-ins, templates, and assorted other enhancements available for 1-2-3, according to a conservative count by Lotus Development Corp. The quantity of enhancement products, however, is not nearly as impressive as what they can do. They help you analyze and experiment, expand and connect, distill and debug, polish and print. Most are downright useful. Of course, some are dumb, some are only moderately useful, and some don't work as advertised.

We sought out the best 1-2-3 enhancements and came up with a baker's dozen of the cleverest products on the market—at least in the subjective views of experts, analysts, publishers, journalists, and users. Our poll was informal, but we found that there are informed opinions out there, and, to a degree, some consensus about 1-2-3's best friends.

Some of the titles that appear on our list, such as *Sideways*, are by 1-2-3 standards oldies but goodies. Others, such as *Macro Editor/Debugger* from Personics, are relatively new. Most are best-sellers, which reflects 1-2-3 users' similar basic needs. Some very good, popular products didn't make our list but easily could have. Some were runners-up

to similar products that we chose: *Impressed* edged *Allways*; *What-If Solver* nosed *What'sBest!*; *Baler* topped *King Jaguar*; and *ForeCalc* beat *Forecast!*. Other honorable mentions go to *@Base*, *Rescue Plus*, *R&R Worksheet Report Writer*, and *Ready-To-Run Accounting*. Not surprisingly, most of the nominations we received were for products with broad appeal—"horizontal" products, in marketing lingo. But many people also sang the praises of specific, "vertical" products such as @function libraries offered by Grey-Matter International, Intex, and others. Surprising is the absence of word processing or graphing add-ins from our roster of nominees.

There were several interesting entries. Lotus's *GraphWriter* and *Magellan*, though not really 1-2-3 enhancements, each garnered a mention. So did *Add-In Toolkit for Release 3*, which makes it easier for people to write add-ins of their own.

Most of the people we contacted use at least one enhancement product, but few load more than two because of memory constraints. "People run out of memory long before they run out of money or interest," notes Allen Moulton, a researcher at MIT and director of the 3,000-member Boston Computer Society's Lotus user group, and others agree. Fortunately, one of our 13 elite enhancements—*Beyond 640*—helps alleviate the memory crunch.

And the winners are:

•
The 13 winners dramatically expand 1-2-3's ability to analyze, connect, distill, debug, polish, and print.
•

THE BEST



ADD-INS

• *Sideways* invented the formula for a successful add-in: It found something 1-2-3 didn't do and did it very well.

•

SIDEWAYS

If the 1-2-3 enhancement market is old enough to have a classic product, that product is *Sideways*. And as with classic Coca-Cola, the public isn't ready just yet to forsake this venerable add-in for anything new.

Sideways invented the formula for success: Find something 1-2-3 doesn't do that people want to do, do it, then make it a snap to use. In the case of *Sideways*, that something is printing spreadsheets lengthwise across one or more pages—cleanly, legibly, and efficiently. Sure, landscape printing is standard operating procedure for laser printers, but dot-matrix sales are still climbing. And *Sideways* works even faster with a new add-in print spooler from Funk Software called *P.D.Queue*. So much for early retirement.

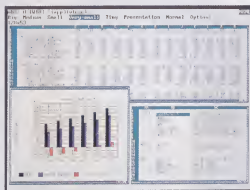
"I think there's always a place for an add-in that's small and fast and does what it's supposed to, and *Sideways* still fits that mold," notes Jerry Lerman, an independent software developer who coau-

thored several add-in products marketed by Personics, including *SeeMore* and *Look&Link*.

Sideways (Funk Software, 222 Third St., Cambridge, MA 02142; 617-497-6339). Works with Releases 2.x and 3.x.

SQZ! PLUS

If you're one of those people who enjoys playing around with new software, savor your early moments with *SQZ! Plus*—you may never have to see it again. "The



■ *SeeMore* can double, triple, or quadruple the number of rows and columns displayed on the screen.

best part is once you install it, it works automatically—you don't have to teach anybody anything, and it doesn't interfere with any-

thing else," explains Bill Weil, a computer consultant in the San Francisco area who develops 1-2-3 spreadsheet models and training courses.

SQZ! Plus works in the background to automatically compress a spreadsheet file as it is saved, reducing it to less than one-tenth its original size in some cases. Then it "unsqueezes" the file as you load it. The program has other valuable, visible qualities, too. You can back up a file from within 1-2-3 or recover a damaged file, for example. But the main appeal of *SQZ! Plus* is its ability to lighten the burden on a hard disk without putting any additional burden on the user.

SQZ! Plus (Symantec Corp., 135 South Rd., Bedford, MA 01730; 617-275-4800). Works with Release 2.x.

SEEMORE

Simple problems deserve simple, elegant solutions.

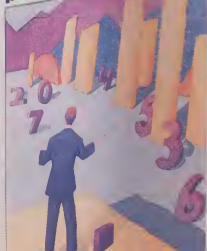
SeeMore provides them. *SeeMore* is an add-in "screen manager" that can double, triple, or even quadruple the number of

PHOTOGRAPHY BY SUSIE CUSHNER

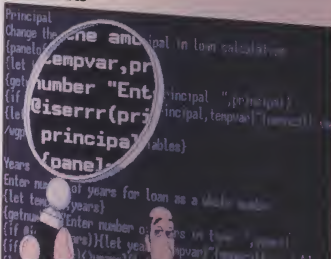
The 1-2-3

SEEMORE

personics



personics

NEW
FOR 1-2-3

The 1-2-3

Macro Editor/V

cells that 1-2-3 displays on the screen at once—without affecting the way 1-2-3 operates.

You can quickly change display modes as you work, and create multiple windows on the screen to see several worksheet sections or graphs together. On EGA and VGA monitors, you can set screen colors, as well. *SeeMore* doesn't buy more screen space; it just makes everything smaller so that you can put more into what you have.

"It's an excellent idea and a very good implementation," says *Sideways* creator Paul Funk. *SeeMore* is the only product other than his own that he personally uses. "We kicked ourselves a bit for not thinking of it first," he says.

SeeMore (Personics Corp., 63 Great Rd., Maynard, MA 01754; 508-897-1575). Works with Release 2.x.

IMPRESS

For 1-2-3 users, spreadsheet publishing has been a term defined mainly by the presentation-quality output of *Allways*. Today

it's defined by the output and graphical interface of *Impress*.

Impress employs a "live" what-you-see-is-what-you-get interface that not only displays fonts and

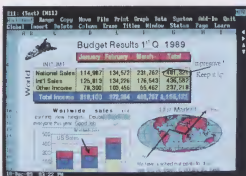
and-column display, and limited word processing. Print output with the second release is much sharper and clearer than the first.

Lotus was impressed enough to include *Impress* technology in Release 3.1. "*Impress* just feels and appears more natural [than *Allways*]," explains Bill Zeigler, an information systems manager and leader of the Lotus special interest group (SIG) at the Chicago Computer Society. "You can get good output with either one, but you don't have to muscle *Impress* as much."

Impress (PC Publishing, 1801 Avenue of the Stars, #815, Los Angeles, CA 90067; 213-556-3630) Works with Release 2.x; some of the technology is included in Release 3.1.

MACRO EDITOR/DEBUGGER

There are no conspicuous holes left to fill in 1-2-3, right? Anyone who's spent an hour or more combing through his or her macro code to figure out where



Lotus liked the WYSIWYG environment of *Impress* so much it incorporated the technology into 1-2-3 Release 3.1.

graphics together on the screen but enables you to interact with 1-2-3 without reverting back to 1-2-3's standard character-based mode. You can also use a mouse to gain access to 1-2-3 menu choices and to move around the worksheet.

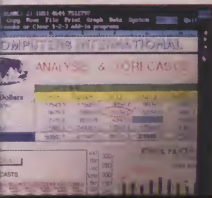
Version 2 of *Impress* works with more fonts, colors, and graphics formats than version 1, plus a few features found in other add-ins, including sideways printing on laser printers, extended row-



ADD-INS

For Lotus 1-2-3
Release 2.0, 2.01 & 2.2

PUBLISHING
IMPRESS™
Version 2L



SYMANTEC™

SQZ! Plus

The Spreadsheet File Utility System for Lotus

Compress spreadsheet files by

THE BEST

ADD-INS

they went wrong might beg to differ.

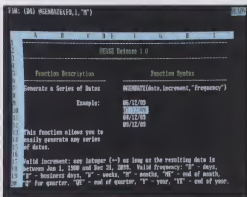
That's where a new add-in called *Macro Editor/Debugger*, or *ME/D*, comes in. *ME/D*'s interactive Debugger window pops up on screen and takes you through your macro code—one instruction at a time, one cell at a time, or full speed—and spots error conditions. When an error is detected, you can move to the Editor window to correct the problem (the detailed explanations of error messages in the user's manual should help), then jump back to the Debugger to pick up where you left off. The Debugger's pointer, along with preset "breakpoints" and "watchpoints," makes it easy to maneuver your way through macros, too.

"I don't think everybody is going to need it, but for those who do need it, it's going to be a godsend," says Don Selesky, an independent add-in developer whose credits include *@Base* and *Look & Link*.

Macro Editor/Debugger (Perronics Corp.). Works with Release 2.x.

@EASE

When you spend a good part of the day inside a spreadsheet, the little frustrations in labeling, formatting, and calculating can be-



■ *@Ease*'s specialized *@functions* streamline common labeling, formatting, and calculating chores in the worksheet.

come big headaches. Think of *@Ease* as aspirin for worksheet warriors.

@Ease is a collection of add-in *@functions* that alleviate the angst involved in performing seemingly simple tasks, such as entering a series of consecutive dates, figuring subtotals and grand totals, and centering a heading over a data range. *@Ease* expedites these and other poten-

tially exasperating chores. It's the art of the mundane, to be sure, but you may find yourself whispering, "thank you, thank you" before long.

"It's one of those products that does some incredibly useful, commonly needed things," says Lotus's Kenneth Lownie, a member of the developer marketing group.

@Ease (Spreadsheet Solutions, 600 Old Country Rd., Garden City, NY 11530; 516-222-1429). Works with Releases 2.x and 3.x.

WHAT-IF SOLVER

Remember those confounding equations from your math textbooks that always began something like "If apples cost 5 cents, and oranges cost 7 cents, how much money will Jane need to buy...?" To a second- or third-grader, it could be a mind-boggling problem. T

he trouble is things don't get any simpler in the real world of business, where how you mix your apples and oranges can result in a profit or loss.

What-If Solver, a goal-seeking

Plus
Activity System for Lotus

FOR 1-2-3[®] RELEASE 3,
2.2, 2.01, SYMPHONY[®]

WHAT-IF
SOLVER[™]

Feasible or Optimal Solutions
Spreadsheet Problem

FRONTLINE
SYSTEMS

ONLINE
ITEMS

ions
problem

Baler

Baler

Baler

Baler

and optimization analysis add-in similar to the Solver function in *1-2-3/G*, can help. Basically, you mark some cells in your *1-2-3* worksheet as variable or "what if" cells, others as limiter or "constraint" cells, and in some cases, one as an "optimum" cell to be minimized or maximized. *What-If Solver* then finds the values that produce the optimal solution. *What-If Solver* can handle problems that extend beyond the scope of either simple goal seekers (such as its related product, *What-If Analyst*) or linear optimizers (such as *What'sBest!*).

What-If Solver (Frontline Systems, 140 University Ave., Suite 100, Palo Alto, CA 94301; 415-327-7297). Works with Releases 2.x and 3.x.

FORECALC

There may be few guarantees in life, but there are plenty of forecasts. And while some forecasters gaze into crystal balls, *1-2-3* users tend to prefer a more scientific approach, such as the one in *ForeCalc*.

ForeCalc is a business fore-

casting add-in that enables you to project future activity based on historical data, such as sales figures or expenses, that you've already entered in your worksheets. *ForeCalc* is particularly easy to use because it assumes you know little or nothing about statistics or forecasting techniques. The program automatically selects the appropriate forecasting method based on the patterns it finds in your data,

automatic," notes Dan Fylstra, president of Frontline.

ForeCalc (Business Forecast Systems, 68 Leonard St., Belmont, MA 02178; 617-484-5050). Works with Releases 2.x and 3.x.

BALER

Creating a *1-2-3* application simple enough for other people to use is always a tricky proposition and sometimes a risky one because the formulas and macros can be changed inadvertently or deliberately. But *Baler* 5.0 addresses both the simplicity and the security issues.

Baler is a spreadsheet compiler that enables you to create from *1-2-3* spreadsheets stand-alone, self-running applications to distribute or sell (royalty-free) to others. Version 5.0 lets you use virtually all of *1-2-3's* capabilities.

Baler also adds some nice touches: You can add pull-down menus, color, and context-sensitive help to your compiled applications to make them easier to use and more attractive. But it's the capability of making for-

	1990	1991
Cost of goods sold	\$596,796	\$521,388
Marketing	\$67,157	\$63,398
Interest	\$46,131	\$59,685
Taxes on income	\$73,752	\$72,644
	\$1,383,836	\$1,197,116
Net income	\$545,417	\$351,555

Baler turns your spreadsheets into stand-alone applications, complete with pull-down menus and context-sensitive help.

then does its thing. However, you can exercise more control over the process if you want to.

"It was everything we imagined a forecasting program should be, and it's completely



ADD-INS

Baler lets you create stand-alone, secure, self-running applications from 1-2-3 worksheets.

ForeCalc
The Add-In
That Makes Accurate
Forecasting Easy

EASE Makes 1-2-3 formulas by combining everyday spreadsheet tasks!

If I had @EASE I would be home by now.

Bud
Easier Plans

Create Custom Programs from Spreadsheets

THE BEST

ADD-INS

By collapsing
and hiding rows
and columns,
Budget Express
lets you see a
worksheet's big or
little picture.

mulas and macros untouchable that appeals to many businesspeople.

"There's a lot of interest in compilers because security is a big concern and there's very little security built into a 1-2-3 worksheet," reports Mark Gruner, a Dallas-based financial analyst who heads the Lotus SIG at the North Texas PC Users Group. "With *Baler*, I can control the level of protection," he says.

Baler (Baler Software Corp., 1400 Hicks Rd., Rolling Meadows, IL 60008; 708-506-9700). Works with Release 2.x.

BUDGET EXPRESS

Budgeting in a spreadsheet is often one part number crunching and two parts arranging and formatting. 1-2-3 can handle all of the crunching, of course, and *The Budget Express* can handle just about everything else.

The Budget Express organizes the rows of budget line items into an outline format, which not only imposes some discipline on the process of entering items but makes them

easier to find and analyze later. The program is full of shortcuts and formatting helpers and lets you consolidate data from similar worksheets, as well. But it's the "spreadsheet outlining" system, with rows and columns that collapse and expand to hide or show detail, that draws the loud-est raves.

"That's what I really love about *The Budget Express*—the ability to see both the big and the little pictures," says Jack McGrath, editor and publisher of *@Mac*, a

The Budget Express (Symantec Corp.). Works with Release 2.x.

BEYOND 640

Expanded memory has been a mildly cruel joke for many 1-2-3 users, some of whom discovered after adding megabytes of memory to their PCs that Release 2.x can use but a small portion of the added RAM. The problem is the way 1-2-3 uses conventional memory; the solution is *Beyond 640*.

Ordinarily, 1-2-3 keeps its invisible cell pointers, which tell the program where everything's located, strictly in conventional memory (memory up to 640K). That's a problem, because cell pointers can consume a third or more of the memory space needed to store a spreadsheet. When there's no room for any more cell pointers, you're left staring at an *Out of memory* message, regardless of how much expanded memory is available. *Beyond 640* automatically moves 1-2-3 spreadsheets, cell pointers and all, into expanded memory (expanded

The screenshot shows a window titled "Consolidated Budget 1990". It displays a hierarchical budget outline. The left pane shows a tree structure with "Engineering" expanded, listing "Salaries", "George", "Harry", "Total Salaries", "Rents & Drive", and "Equipment". The right pane shows a table with columns for months (Jan, Feb, Mar, Apr, May) and rows for each budget item. Totals are shown at the bottom for each category and overall.

	Jan	Feb	Mar	Apr	May
Engineering					
Salaries					
Joe	4.00	4.00	4.00	4.00	4.00
George	3.50	3.50	3.50	3.50	3.50
Harry	3.75	3.75	3.75	3.75	3.75
Total Salaries	11.25	11.25	11.25	11.25	11.25
Rents & Drive	2.00	2.00	2.00	2.00	2.00
Equipment	10.00				
Total Engineering	23.73	13.73	13.73	13.73	13.73
Marketing					
Salaries					
Ted	4.00	4.00	4.00	4.00	4.00
Total	3.50	3.50	3.50	3.50	3.50

By organizing your budget into an outline, *The Budget Express* lets you see the forest and the trees.

Hingham, Mass.-based monthly newsletter for 1-2-3 users. "People who do budgeting just go wild when I show them that."

SYMANTEC.

he Budget Express
r and Easier Plans, Budgets, and Forecasts

personics

Look&L

memory specification 3.2 or 4.0) as needed. That enables you to tap up to 4 megabytes of expanded memory for huge worksheets, and it frees up conventional memory for such things as pop-up programs and add-ins. "Beyond 640 is a genuinely exciting product because it addresses a very serious problem," says Eric Wolfe, a 1-2-3 macro developer who has encountered memory problems in his work for business clients. "This is one add-in I'll actually use."

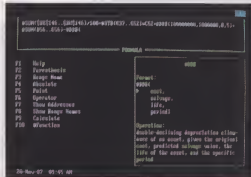
Beyond 640 (Intex Solutions, 161 Highland Ave., Needham, MA 02194; 617-449-6222). Works with Release 2.x.

LOOK&LINK

If you think the linking capabilities in Release 2.2 are nice, you ought to see—quite literally—what you've been missing with *Look&Link*.

In addition to enabling you to forge connections between separate worksheets, *Look&Link* lets you see a second spreadsheet while still working in the first, so you're not flying blind when

comparing or connecting spreadsheets. You can't make any changes to this second sheet, but you can cut and paste data from the "browse window" into your current work. *Look&Link* is better



File backup and formula editing are just two of *The Worksheet Utilities'* worksheet- and file-management capabilities.

at linking than 1-2-3 Release 2.2 because it lets you include a link in a formula and create links to multiple cells.

But even if you buy *Look&Link* for its good connections rather than its good looks, it's likely that, like spreadsheet guru and writer Craig Stinson, you'll find yourself using the program "much more for looking than linking."

Look&Link (Personics Corp.). Works with Release 2.x.

WORKSHEET UTILITIES

If there's a *Norton Utilities* or *PC Tools* for spreadsheet users, it's *The Worksheet Utilities*, a versatile collection of worksheet-editing and file-management tools.

There are lots of reasons to love *The Worksheet Utilities*. The ability to search and replace labels and formulas is one; another reason is the "auto save" function for automatically backing up worksheets. But its two most alluring features are probably its Formula Editor and its File Manager.

The Editor helps you in creating, changing and even debugging formulas, while the Manager helps you sanely organize an ever-growing pile of spreadsheet files, in part by adding explanatory tags to file names.

"It's awfully nice to be able to annotate files when you work with 200 or 300 of them," notes @MAX's Jack McGrath.

The Worksheet Utilities (Funk Software). Works with Release 2.x. —Christopher O'Malley

THE BEST

ADD-INS

INTEX SOLUTIONS, INC.

BEYOND 640

BEYOND 640

THE WORKSHEET UTILITIES

Formula Editor

Includes Both 2.1 & 2.1a Editions

Print Settings

File Manager

Introducing the only expandable, customizable laser font cartridge.

Why One New Multi-font Cartridge Has Everyone in the Office Talking... and Smiling!



"Unlimited fonts, headline type, logos and our own graphics. It's simple to use. That's super!"



"More productivity. Better results. Lower costs. That's great!"



"Forms and letterheads on plain paper. No tray changes and tedious downloading. That's wonderful."



"It has 3.6 and 4.8 point spreadsheet fonts. That's good."

The Revolutionary 25 Plus/Charisma Builds Productivity.

Accounting has to print a spreadsheet. That means changing cartridges for a small font. Billing has to print invoices. That means another font change and reloading the paper tray. Marketing has to print a classy sales proposal. Then there's routine correspondence and prospecting letters. 25 Plus/Charisma keeps your HP Laser Printer from becoming the center of an office log jam.

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- Everything stays in the printer. The Master Cartridge holds up to 4 modules at a time to eliminate downloading and tray changes.
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THE BEST LOTUS USER APPLICATIONS



Picking the best applications of *1-2-3* and *Symphony* was no easy task. With more than 11 million copies in use, there's simply no way to find out what everybody is doing. Sophisticated spreadsheet applications often contain top-secret proprietary information, jealously protected by companies, and innovations by individuals may never be noticed in the outside world.

Nevertheless, we gave it a shot.

We contacted almost 500 companies, consultants, gurus, user-group leaders, and other spreadsheet experts. In addition to numerous applications involving taxes, manufacturing, and budgets, we heard about a gastroenterologist using *1-2-3* to graph the movements of anal sphincter valves, and accountants using *Symphony* to figure out that their company was losing so much money it was time to shut the doors. Respondents told us about one company that enters data into its spreadsheets via voice-recognition software, and how NASA imports telemetry data directly from orbiting satellites into *1-2-3* worksheets.

In Washington, D.C., the House of Representatives has a *1-2-3*-based accounting system that helps hold down office spending. The Washington state legislature uses the program to craft budgets for state agencies, allowing Republicans and Democrats to use the same budget format, speeding consolidation of funding proposals.

The scale of applications varied tremen-

dously. We heard from companies running their entire marketing operations on spreadsheets and also from secretaries using *1-2-3* to save an hour here and an hour there.

LOTUS ranked applications by two main criteria: innovation (both technically within *1-2-3* or *Symphony* and in the wider sense of a new application for the programs) and importance to the organization that uses it. With so many strong candidates to choose from, we strove for a balance among industries; among manufacturing, finance, and other applications; and between large and small companies. We also tried to represent the entire country, not just one geographic region.

We selected an investment house that uses *1-2-3* to rank investment opportunities, a biotechnology company that discovered a simple *1-2-3* trick to rush a product to market, a *1-2-3* application that's changing the role of dairy-farm veterinarians and boosting profits for farmers, a *Symphony*-based strategic-planning system for a midwestern manufacturer, and a statistical testing processor at a high-technology engineering company.

There are important lessons to be learned from even the most esoteric applications, and these five winners demonstrate the depth and breadth of *1-2-3*'s and *Symphony*'s effect on American business. We hope they will inspire you in the quest for better ways to solve your own business problems.

1-2-3 and
Symphony
have had a
dramatic
effect on
American
business.

Biotech Breakthrough

Cetus builds a business with a simple macro link to lab instruments.

BY KELLY CONATSER

Eureka!

The message on Louis M. Mezei's dot-matrix printer meant an end to weeks of frustrating trial and error. The simple *Symphony* technique Mezei used to deliver it helped assure Cetus Corporation, based in Emeryville, Calif., the dominant marketing position in polymerase chain reaction (PCR) technology, one of the hottest areas in biotechnology.

In 1986 Mezei, a biochemist whose 16 patents range from enzyme stabilization to cholesterol measurement, was leading a team of scientists racing to exploit Cetus's new discovery. The PCR process, which singles out a specific, tiny section of a massive DNA molecule and replicates the strand millions of times, represented a giant leap forward in DNA-amplification technology. Researchers use the enlarged sample to study genetic disorders and infectious diseases such as AIDS, or as a forensic tool to provide evidence in criminal trials.

Cetus's DNA-amplification technique combines an infinitesimal number of target DNA molecules, additional small strands of chemically synthesized DNA, and an enzyme derived from an obscure bacterium that lives in geysers. Rapidly heating and cooling this solution many times creates the desired amount of target DNA in a few hours. Previous technology took weeks to create significant amounts of target DNA, if it worked at all.

Cetus planned to market its technology as a complete package through its partner in the project, Perkin-Elmer Corporation. The package includes the enzyme, reagents, and the heating and cooling hardware—a \$6,200 shoebox-size machine known as the DNA Thermal Cycler. But initial versions of the Thermal Cycler proved less than reliable. To perfect the instrument, Cetus's engineers needed an enormous volume of accurate real-time data to measure its performance.

The 44-year-old Mezei, a veteran computer hacker who began his scientific career "way back in the slide-rule days," had already been tinkering with better ways to analyze the enormous volumes of data generated by his experiments. But despite his long experience with such programming languages as Fortran, C, and BASIC, Mezei was a relative neophyte when it came to spreadsheets. His most ambitious project had been a simple template containing his department budget.

But even with his limited experience, Mezei realized that a seamless interface between the

spreadsheet and his instruments was the only way to eliminate the "killer transcription errors" that plagued scientists working with large amounts of data. He tried to create a real-time link using *Measure*, an add-in designed for that purpose, now sold by National Instruments Corp. of Austin, Tex. However, Mezei found *Measure's* documentation so inscrutable that he threw it across the room and gave up.

Based on his background in other computer languages, Mezei wondered if *1-2-3* and *Symphony's* (OPEN) command could be used like the FOPEN command in C, which can open a PC communication port. He hypothesized that the technique could work if he substituted a device-name argument for the (OPEN) command's filename argument. With growing excitement, he turned on his printer and executed the following simple macro:

```
{OPEN "COM1", M}
{WRITELN "Eureka!"}
```

Nothing happened.

Days later, Mezei realized that his printer was connected to his computer's COM2 port, not COM1. He edited the (OPEN) command and sent the string again. This time, his Epson printed it. He plugged a bar-code reader into the port and executed the macro again, replacing the (WRITELN) statement with a (READLN) statement. The macro placed data from the bar-code reader into the range indicated by the (READLN) statement, and Mezei knew that he had the two-way data link he needed to fully control his instruments.

The next day, Mezei perfected the interface between the Thermal Cycler and *Symphony*. A macro collected temperature data from the instrument and stored them in specified ranges for analysis. A spreadsheet link to a second instrument measured the amount of DNA created with each run of the Cycler. The data proved conclusively that large-scale DNA replication occurs only at precise temperatures around 95°C, and that heating and cooling the sample at a smooth rate was critical—facts new to Cetus's researchers. It also showed that the Thermal Cycler heated the sample unevenly, causing inaccurate results.

Mezei graphed his data in *Lotus Freelance Plus* and issued a report to upper management. Cetus's engineers quickly corrected the Thermal Cycler's design problems, and the data Mezei collected from the revised product proved that it worked to specifications. "If he hadn't done that, we would have had trouble trying to introduce the instrument," says Jon Raymond, senior director of product development at Cetus's PCR division.

The revenue from the more than 3,000 Thermal Cyclers sold to date became especially important to Cetus last August, when the Food and Drug

Administration unexpectedly withheld approval for interleukin-2, a non-PCR cancer treatment that had been expected to become the company's flagship product.

Once Cetus perfected the Thermal Cycler, Mezei quickly moved to expand upon his discovery. He soon found that the start-of-text and end-of-text strings required by each instrument's processor could easily be altered from within the spreadsheet, allowing him to communicate with a multitude of lab instruments.

"It was like finding a secret passageway in the Taj Mahal," says Glenn Ouchi, editor of *Laboratory PC User*, a San Jose, Calif., newsletter. By retrieving a different file with a slightly altered interface, Mezei uses the macro to communicate with instruments as diverse as a 9,600-bit-per-second (bps) analog-to-digital converter and a 300-bps balance that weighs samples as small as one-millionth of a pound.

Mezei's quest began in *Symphony*, whose database-management tools and enhanced windowing capabilities make it his spreadsheet of choice, but his great volume of data soon forced him to move his application to *1-2-3*. On a 640K system without expanded memory, Mezei estimates that *1-2-3* Release 2.01 can accommodate 34,500 data cells, compared with 23,000 in *Symphony* Release 2.

He attempted to duplicate his results in both *Microsoft Excel* and *Quattro*, but found that neither would let him open an RS-232 port. This lack of success did not upset him; he's not impressed by graphical spreadsheet interfaces. "Laboratories are not a good environment for mice," he deadpans.

In his book *Laboratory Lotus*, published by Prentice Hall in 1989, Mezei explains how to establish real-time PC-to-instrument links through a PC's RS-232 port, such as COM1 or COM2, along with 30 "easy steps" to connect the spreadsheet



USERS



•
Lou Mezei used
Symphony's
{OPEN} command
to create a link
to Cetus's lab
instruments.
•

1-2-3 helps
financier
Cleveland
Christophe
keep debt
and equity
in line when
bidding on a deal.

interface with any outside instrument. The technique could prove infectious. "Any [instrument or machine] that has a command set should be easy" to link to a PC, Mezei claims, "as long as it's not running too fast." For instruments or machines transmitting data faster than 9,600 bps, he grudgingly recommends *Measure*, which stores the information in a buffer until the PC can process it.

Mezei's spreadsheet-based research has proven to be more than a single-product windfall for Cetus. Spreadsheet control of lab instruments cuts costs on an ongoing basis. "To repeat experiments is really expensive," Mezei notes. "If we misinterpret an experiment because somebody inverted a number, it can cost us a lot of money."

Dealmaking at Equico

A 1-2-3 template makes or breaks billion-dollar buyouts.

BY SYLVIA HELM

Two weeks after Cleveland Christophe joined the TLC Group L.P. in 1987, the New York-based leveraged-buyout firm asked him to evaluate the possible purchase of Beatrice International Food Company from Kohlberg Kravis Roberts & Company. Christophe eyeballed the deal overnight, priced it at \$950 million, and said, "Let's do it."

He made the determination—and subsequently structured the entire financing—on his own *Symphony*-based spreadsheet model. The deal eventually totalled \$985 million.

Today Christophe and his model sift through potential deals for Equico Capital Corporation, a wholly owned subsidiary of the Equitable Life Assurance Company. In February Christophe became a vice president at the firm, which has financed more than 72 small businesses since its formation in 1971.

Christophe's 1.2-megabyte model now runs in 1-2-3 Release 3, boasts 5,000 lines of macros, and offers six custom menus. It generates a full set of financial statements, including cash flow and debt analysis, and calculates the rate of return for seven levels of investors. "Without this tool," says Christophe, "there's no way I could do the in-depth analysis, testing, and planning in time." He asserts that the model lets him do in about five hours what used to take a week.

"The model substantially enhances our ability to respond to investment proposals," agrees Duane Hill, president and CEO of Equico. With sufficient data, Hill says, Equico can make its decisions in 24 to 48 hours and still get "a much more intelligent

and informed view than we had in the past."

Christophe's model offered a significant improvement in speed and flexibility over Equico's existing 1-2-3 templates. Equico has already used the model to evaluate a variety of deals, including acquiring a couple of banks and a \$40-million purchase of a national service company that acquired a new subsidiary midway through the analysis. Equico must look at more than 100 possible deals to find three that are worth pursuing.

To identify deals worth pursuing, Christophe's model concentrates on the optimal ratio between debt and equity. Unfortunately, the factors that influence this ratio affect one another in a circular fashion. In a given period, a company's interest expense depends on its debt level. The debt level depends on the amount of cash flow the company can generate to pay down its debt. Cash flow depends—at least in part—on what the company must pay in interest expenses. The model has to juggle multiple calculations to converge on the value that solves all the equations.

The easy way around this dynamic interdependency is to use the previous period's debt and interest figures as a "best guess" for the current period. But Christophe wants to boost accuracy for his profit projections by using current interest rates and earnings.

He solves this problem by recalculating the relationships as many as 20 times. When setting up the worksheet, Christophe watches the income statement while he hits the **REC** key. As long as the figures keep changing, he knows the worksheet needs to keep recalculating. The size of the model, coupled with the number of dependencies, determines the number of recalculations needed.

To break into the circle of variables, Christophe "jump-starts" the program with a macro called *Trigger*. The macro overwrites the circular formulas with an arbitrary value, recalculates the worksheet, then overwrites the arbitrary values with the original formulas.

This complex model demands clean input. An incorrect entry can quickly spread errors throughout the worksheet. Christophe's only defense is to keep errors from getting into the model in the first place. He designed an error-checking system that, as he puts it, "works the way you and I work." Rather than immediately overwriting an input cell's current contents, the worksheet first stores the input in a holding cell. Before posting the data to the worksheet, the model checks the contents of the holding cell to make sure it contains a valid input.

Christophe's model relies heavily on string formulas and concatenation. The model will automatically change selections in **[MENU]** and **[MENU]** statements, for example. "There are very few macro commands and formulas that I



don't use," he claims. "The financial ones are absolutely critical—I could use a few more." He dreams of a library of arcane @functions to perform specialized financial tasks.

Christophe plans to use the *Lotus Add-In Toolkit for Release 3.1* in order to create some of these @functions. He also hopes to enhance his ability to audit his worksheets: "Finding errors, finding cell content, doing global edits." Release 3 indicates where formulas and text are located, but Christophe wants more—for example, he wants a sophisticated spreadsheet map that can track the interde-

pendencies of each cell.

As Christophe's model has grown more sophisticated, so has the hardware he runs it on. The 48K Apple II he bought 10 years ago when he first started playing with spreadsheets has evolved into a 25-MHz, '386 Dell System 325, with 8 megabytes of RAM and a math coprocessor. The whole system runs under the Desqview multitasking environment and connects to a half dozen other Dell and AST Research '386 machines via a Novell local area network.

No matter what the platform, Christophe's model

THE BEST

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Software designed
by John Fetrow,
VMD, MBA, lets
vets manage entire
herds, not just
individual cows.

has more than proved its worth. While the pressure of crushing debt loads on many leveraged buyouts has led to a collapse in the junk-bond market, Christophe's 1-2-3-based financing of Beatrice Food hasn't stumbled. "It's doing OK," he says. "It's not one of the ones you read about." That's something you can't say about a lot of other such deals.

Sylvia Helm is a New York-based free-lance writer.

1-2-3 on the Farm

Visionary veterinarians modernize
dairy-farm management.

BY FREDRIC PAUL

Cows are an investment, too." Guided by this simple concept, a pair of veterinarians equipped with Wharton MBAs are using 1-2-3 to change the nature of food-animal veterinary practice and boost the profits of dairy farmers. Although vets still care for sick cows, the focus now centers on managing the health of the herd.

How do you conduct a physical exam on a herd? You examine its records with 1-2-3. The key tool in this new approach is *Dairy Production Medicine*

Software (DPMS), a six-disk package of more than thirty 1-2-3 spreadsheets that lets vets analyze the health, economics, nutrition, and productive status of dairy herds.

John Fetrow, VMD, MBA, designed the software to "diagnose" herd "symptoms," such as low milk production, poor reproduction, or high feed costs. Fetrow is professor of medicine in the Department of Food Animal and Equine Medicine at North Carolina State University's College of Veterinary Medicine. From his modern office in North Carolina State's sleek veterinary medical center in suburban Raleigh, Fetrow explains that dairy farms are under increasing economic pressure. He claims that "the veterinary profession can be a major player in making it possible for dairymen to survive financially."

David Galligan, VMD, MBA, contributed to the DPMS package with a sophisticated nutrition program that uses linear programming to determine the most economical mix of feeds. An assistant professor in animal-health economics at the University of Pennsylvania School of Veterinary Medicine, Galligan says that "food-animal veterinary medicine is changing from an emphasis on the individual animal to statistical analysis of the herd." In the bucolic setting of the university's New Bolton Center in Kennett Square, Pa., he tells his students that modern food-animal practitioners "need this [program] more than they need surgical instruments."

More and more vets are learning to work with statistical data, according to John Clay, a Raleigh-based extension specialist at the Dairy Records Processing Center, which supplies much of the baseline data for DPMS. Over 400 dairy-cow vets have ordered DPMS, about 10 percent of the total practitioners in the field. About 700 have ordered Galligan's nutrition program.

The DPMS package includes a variety of Release 2.x templates covering dairy-farm economics, planning and financial analysis, and graph and form creation. But the core is the 130K *Dairy Herd Monitor* worksheet, which offers a structure for storing and analyzing health and production parameters on a monthly basis. Under development since 1985, the macro-driven core worksheet can hold seven years of data in 640K.

Users enter data on the herd compiled from the Dairy Herd Improvement Association and farm records. The program analyzes more than 50 variables and prepares a pair of status reports that compare goals with actual conditions for both the current month and the average month for the past year. Macro-driven @IF formulas automatically extend the averaging for small herds to smooth out skewed results due to small denominators.

Fetrow divided the variables into eight groups: milk production and income value, production

PAUL DAVIS



based on time since the cow calved, how fat or skinny the cow is, an inventory of animals on the farm, which cows have been sent off to become hamburger, reproduction performance, udder infections and disease, and calves and replacement stock too young to produce milk.

To highlight trends and possible problems, the worksheet automatically stars results that don't match preset goals. If the average month is flagged, for example, but the current month is not, an old problem may be almost solved. The opposite situation might indicate a new problem.

The program's most sophisticated macros pull data from different parts of the worksheet to generate a variety of graphs. Vets can pinpoint possible causes for problems by comparing up to three variables at once. A subroutine adjusts the scales to make it easier to show correlations between factors.

For example, a state dairy in North Carolina recently noticed a drop in milk production. Graphing production against reproductive performance showed reproduction rates varying along with production. To the vet, this indicated that the farm was taking too long to get its cows pregnant again once their milk production declined. Perhaps the dairyman was failing to notice when the cows were going into heat in time to artificially inseminate them. In this case, it turned out that the dairyman was distracted by his wife's pregnancy and was indeed paying less attention to the herd.

While the *Dairy Herd Monitor* looks at overall herd health, Galligan's nutrition template uses Enfin Software Corp.'s linear programming add-on to optimize bovine nutrition, which represents more than half the cost of producing milk. "Nutrition is the real pulse of the herd," he says. "That's where all the money is at."

Galligan's 280K worksheet "runs virtually every command [1-2-3] offers," he says. Nested @IF formulas calculate nutrient parameters, depending on whether the cow is gaining or losing weight, for example, and matrix calculations evaluate the economics of a given feed's nutrients.

A separate part of the worksheet holds a feed bank that lists 30 nutritional elements for up to 100 feeds. "You can make mixes of feeds and store that in the feed bank, as well," Galligan says.

The worksheet begins with the National Research Council's figures on nutritional requirements for dairy cows and asks users to enter the cow's body weight, milk production, and weight change. It then calculates the optimum mix of available feeds that will meet all nutritional requirements at the lowest possible cost. "You can even calculate how much grass a cow will eat in the pasture and include the nutrition from that," Galligan says. He reports that the University of Pennsylvania test herds show feed-cost savings of

10% to 15% using the system.

The program can also determine whether the nutrition in a given feed makes it a good buy. "Feed companies don't like this," Galligan says, but farmers love it.

Bob Stoltzfus, VMD, a dairy-cow vet at Lancaster Veterinary Associates in Lancaster County, Pa., notes that statistical analysis is less important when the farmer knows each cow individually. "A guy with 20 cows doesn't need much computer stuff," he says, "and he's reluctant to pay for it." But gut reactions need quantitative backup as the herd grows. Stoltzfus testifies that Galligan's nutrition module "has been an absolute blessing for us. It's an essential part of the development of that part of our practice."

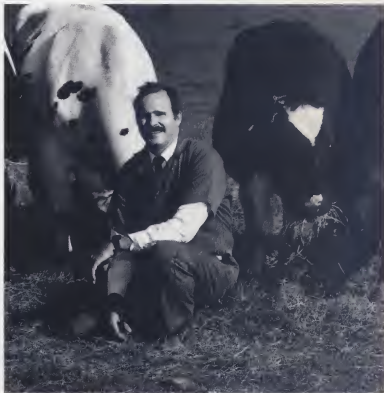
DPMS is helping to move food-animal veterinary practice into a new era of economic, not just biological, management. That's critical, Fetrow says, because "what's good for the herd biologically could be destructive in terms of cash flow."

Mark Catlin, VMD, a vet with the Maple Leaf Large Animal Clinic in Montpelier, Vt., has been a devotee of DPMS for five years. He says the package has made his practice "more goal oriented" and makes him feel "a great deal more integrated into the management of the farm." The software may not create a healthier herd, says Catlin, but its bottom-line performance certainly "makes for a healthier dairy farmer."



USERS

Veterinarian
David Galligan's
nutrition work-
sheet determines
the most efficient
way to feed a herd.



THE BEST

USERS

Bottom-up Planning

Middle managers rally around Eaton's strategic system based on 1-2-3 and Symphony.

BY PATRICIA L. PANCHAK

Cleveland-based Eaton Corporation is an "autonomously managed" company. Senior management sets goals, gives division managers a variety of tools to reach the goals, and lets them go to work. So it says something when the majority of Eaton's managers embrace a new software application.

Eaton's 1-2-3 and Symphony-based strategic-planning application, called *EtnPlan*, has been voluntarily adopted by more than 50 division managers, representing about 70% of the managers

involved in the strategic-planning process.

Achieving such a following at a corporation as large as Eaton wasn't easy. The \$3.67-billion global manufacturer makes more than 5,000 products worldwide and operates 130 facilities in 20 countries. *EtnPlan* succeeds because it helps division managers generate and deliver the financial reports required by senior management. Once the data reaches the corporate mainframe financial database, *EtnPlan* helps improve strategic planning.

Bob Martin, Eaton's manager of executive support systems, designed *EtnPlan* to support the company's goal of decentralized decision-making with on-site analytical power. "We start with the first guy who puts the numbers in," Martin says. "My feeling is, the more he knows about that number and how it's being used, the more he's going to improve the quality of the plan. The benefits are subjective, yet very definite."

David Jenny, controller of U.S. operations for the

•
Bob Martin
uses 1-2-3 and
Symphony to
decentralize
Eaton's strategic-
planning process.
•



ROGER NASTRICANN

Engineered Fasteners Division, agrees that *EtnPlan* delivers more representative numbers. Jenny uses the program to generate division-plan reports based on data and reports from three plants. "The system ties the data together—you don't have to do cross-and-back-checking—so you can prepare the plan more quickly," Jenny says. "By being able to do it quicker, we can do it more thoroughly and put more thought behind the numbers."

EtnPlan begins with the "action programs" at each plant, rolls that data into how those programs affect each product line, then determines how the products affect the business units and the corporation as a whole. Users access the core of the application through the data file and report menus, each of which has three main segments: the action program, the product line, and the business unit.

"The action programs are really the things around which the strategic plan gets started," says Martin. Action programs include any proposed programs that affect the finances of the business, such as a cost-saving technology or new-product-development initiative, and include the implementation costs. The product-line and business-unit data segments contain historical and projected financial information about each product and business unit, respectively. Entries in the product files include market share, sales, and profit data. Business files hold information such as market growth rate and tax rates. Together, these three modules "manage the building and editing of data files," Martin says.

The report segment combines data files from action-program, product-line, and business-unit modules to create complex reports, each of which may use results from other reports. Linking the segments also lets managers more easily perform "what-if" queries: any changes in the data file immediately show up in the business-unit or product-line report.

EtnPlan also includes *EtnValu*, consolidation, and allocation-table modules. *EtnValu* uses proprietary formulas to evaluate which action programs provide the most benefits for the corporation as a whole. "Most of the time, a manager will have more options than he can fund or that he has people to work on," explains Martin.

The consolidation module generates reports combining product-line and business-unit data. The allocation-table module simply tracks the action-program resources that the manager has allocated (in the product-line data file) to the different product lines.

Martin originally developed *EtnPlan* in 1-2-3, back in 1983. Before that, managers did their planning with ledger pads, calculators, and pencils. When Lotus released *Symphony* in 1984, Martin adapted the system to the new integrated environment. Over time *Symphony*'s superior macro

protection, ability to integrate text into spreadsheet documents, and window development tools made it the dominant platform. Some users still rely on 1-2-3, however, and Martin is working on versions of *EtnPlan* for 1-2-3 Release 3 and 1-2-3/G.

The current *Symphony* version of *EtnPlan* requires a PC with 640K of conventional memory and at least 500K of expanded memory. The model needs about 750K of hard-disk space, plus nearly 250K to hold an average business unit's data files.

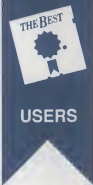
Despite its proven benefits, *EtnPlan* still suffers from slow and difficult verification when transferring data to the corporate mainframe. That's partly because of the wide variety of communication methods Eaton uses, including passing disks, 3270 terminal emulators, and dial-up modems. Next year Martin hopes to ease the situation by installing 1-2-3/M on the mainframe, providing a common environment.

Some divisions require more-detailed worksheets than *EtnPlan* can accommodate. Bill Woll, a plant controller in the Vehicle Components Group, says his division analyzes entire statements of expenses, applying inflation factors to each line, but *EtnPlan* represents manufacturing expenses with a single number adjusted for inflation.

Martin tries to satisfy such special needs without overcomplicating the system. "When I make revisions," he says, "it's always driven by the variations in the user's starting requirements."

The benefits of spreadsheet-driven planning have led most major corporations to begin moving their strategic-planning systems from mainframes to PCs. But Eaton's advanced bottom-up approach helps decentralize decision-making as well as data collection. It offers the data and analysis tools to the line managers who need them most.

Patricia L. Panchak is a free-lance writer and an assistant editor at *Modern Office Technology* magazine, in Cleveland.



Zero Failures at IBM

1-2-3 helps make
reliable mainframe components.

BY RICHARD CRANFORD

At first glance, the mock-up thermal-conduction module (TCM) Jim Stevens keeps on his desk seems relatively straightforward: a ceramic square and a metal casing to hold, interconnect, and cool an array of silvery microchips. But the TCM, designed and built by the Packaging Plant at IBM's sprawling manufacturing operation in East Fishkill, N.Y., is anything but simple.



A TCM is to a mainframe what a motherboard is to a PC—and the same TCM design has seen IBM through three generations of mainframes. "It gave IBM economies and growth capabilities no one else had," says one industry analyst.

The TCM consists of a ceramic substrate made of proprietary materials that houses pathways for the 800 meters of hair-thin wires that connect the chips. A metal heat sink fitted with spring-loaded pins draws heat away. In October the TCM received the 1990 Corporate Innovation Recognition Award

from the Institute of Electrical and Electronics Engineers (IEEE). For all its complexity, not one of the millions of TCMs put into service since 1980 has failed in billions of hours of use.

1-2-3 plays a key role in maintaining this zero-defects record. Since 1980 Stevens has drawn on his background as a statistician to assure quality by analyzing procedures, materials, and tools. But performing exhaustive analyses using mainframe software, as Stevens did back then, is a daunting task, requiring intimate knowledge of the SAS

TOM WOLFE

statistical-software package. Typical PC-based statistical-software packages are often just as difficult to use. To Senior Engineer Stevens and Associate Engineer Lisa Selander, *I-2-3* offered a better way.

They developed the Engineering Analysis System (EAS) to provide the power of statistical analysis to engineers who have no formal training in statistics. EAS makes statistical analysis painless by presenting a single, familiar interface to programs from different vendors. It cuts costs and increases the reliability of packaging's products by letting engineers statistically test data on new processes, material formulations, and assembly-tool calibrations. The alternative is more-expensive, less-reliable trial-and-error testing.

Associate Engineer Glen Biggs, responsible for the process that applies a thin film of metal to the ceramic substrate before mounting the chips, testifies to the importance of the system. After just a week and a half of using EAS to analyze thickness readings from samples of coated "bricks," he was getting a clear picture of where the problems lurked. "I'm now better able to tell fellow engineers what problem areas to watch for," Biggs says.

EAS is already working in some 25 departments at IBM's East Fishkill packaging operation, which produces the substrate, the heat sink—everything in a TCM except the chips. It uses *I-2-3* Release 3 running under OS/2 and works with *Lotus Freelance Plus* and specialized statistics software from Northwest Analytical of Portland, Ore.

EAS analyzes data, such as temperatures or thicknesses, that has been sent to mainframe databases by automated tools such as metal evaporators and insulating-film applicators. Stevens wrote his own conversion programs to transform DB2 data to worksheet files readable by *I-2-3*.

Guided by *I-2-3*-generated prompts and menus, users select the file and the data they want to analyze. Some of the menus come from worksheet macros, others from custom add-ins created with the *Lotus Add-In Toolkit*. Once the system gets the data on board, other macros and add-in programs perform simple statistical analyses within *I-2-3*. The add-ins help users decide what parameters to use (for example, the number of standard deviations to use in creating control limits).

To perform more-complex analyses—such as process-capability studies and multivariable regression analysis—the system sends the data to a data file and the entered parameters to a header file. Then it uses the [SYSTEM] command to leave *I-2-3* temporarily and start one of the Northwest Analytical statistical programs. Entering QA followed by the name of a command file on the OS/2 command line is enough to automatically run *Quality Analyst* with the desired parameters.

Statpak, the other Northwest Analytical package, forced Stevens to trick that program into

thinking it's being controlled from the keyboard. His macro incorporates the parameters that the user enters (while *I-2-3* is active) into a "script," a file containing characters that correspond to the keys a user would press while using *Statpak*. The command SP<filename> causes *Statpak* to read and act on the characters in *filename* as if they were coming from the keyboard. When the user needs to create a box plot, for example, EAS sends the appropriate characters to a file called BOX.P.TXT, which causes *Statpak* to create a box plot.

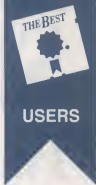
EAS assists engineers unfamiliar with advanced statistics by creating an on-screen graph. Engineers who understand the production processes and the values being measured—for example, the thicknesses at various points of a metal film applied to the substrate—can use the graphs to interpret the data without having to learn the intricacies of the statistical processes. Many graphs take the form of easily understood bell curves. Text messages at the bottom of the graph quantify characteristics, such as "kurtosis" (peakedness of a curve), that aren't easy to depict visually.

Quality Analyst and *Statpak* export graphs as PIC files, the same format *I-2-3* Release 2.x uses to save graphs. For presentations, EAS prints the graphs on transparencies by using *Freelance Plus*. The *Freelance Plus* component is the only part of the system that doesn't run in OS/2, and this is the only step that requires user intervention.

Despite its sophisticated programming and links to other software, Stevens considers the current system to be an interim solution. By the end of 1990, Stevens and Selander plan to "ship" EAS Release 2, which will use *I-2-3/G*, as well as products that so far exist only in beta-test versions, notably *Lotus Freelance Graphics for OS/2* and *WordPerfect for Presentation Manager*. Release 2 will use *Lotus's DataLens* to gather the automated-tools data and make it available to *I-2-3/G*.

EAS Release 2 will run faster and without user intervention, pack more power in its spreadsheet core, and sport mouse-operated menus. *Freelance Graphics* and *WordPerfect for Presentation Manager* not only run under OS/2, eliminating the need for using the compatibility box, they also interface directly with *I-2-3/G*, eliminating the need to exit to the operating system.

IBM's engineers don't want to wait for the new version. Enthusiasm for the application runs high in East Fishkill, and the operation plans 100 EAS installations in the packaging lab and 300 more in packaging production. The semiconductor facility at East Fishkill also wants EAS and will boost total installations to about 1,000. According to Stevens, that's only the beginning. Engineers at other IBM sites are eager to take advantage of EAS to fine-tune techniques and materials, speed testing, and improve the quality of their own components. ■



IBM's
Jim Stevens
built his
statistical
quality-control
system around
I-2-3's familiar
interface.

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- Clock/calendar chip rated at 5 years
- 100 watt power supply
- Small footprint SlimLine case with room for two exposed and 1 internal half-height devices
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- 12" VGA monochrome monitor
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Sorting Through the Database Noise

Paradox, Rbase, and Clarion pressure dBase.

BY GARRY RAY

If you rely on the PC press for information on databases, chances are you're confused.

It's fascinating to follow an industry in the throes of redefining its future with Structured Query Language (SQL), LAN Manager, and client-server front-end development tools. But it's not particularly practical. If you're looking for help organizing customer lists or determining which suppliers are meeting your needs, you don't need industry speculation—you need a database, plain and simple.

Fortunately, amid the hype and hustle are a handful of database reviews that will steer you toward products you can use today.

Separating the reviews into two categories—"flat-file" databases and relational databases—should give you an idea of the range of today's offerings. On the low end of the scale, inexpensive flat-file databases work with only one file at a time. Imagine a 1-2-3 database with better reporting and record-selection capabilities and you'll have the paradigm of the flat-file database, best represented by programs such as Symantec Corp.'s *Q&A* and Borland International's *Reflex*.

Also included in this category are "single-file" programmable databases, which go one step beyond their flat-file cousins. Single-file databases let you look at other files but won't necessarily let you make changes to them. A program such as Alpha Software Corp.'s *Alpha Four*, for example, will let you validate a customer order by looking in the inventory file but won't let you update the inventory back order from the customer file. For that kind of application, you need to bump up to the second category, the relational databases.

The Rationale Behind Relational

E. F. Codd, a computer scientist who developed the relational model in the late sixties while working for IBM, proposed that data should be stored in tables that can be accessed through a single set of commands, regardless of the location of a given table. Like flat files and 1-2-3 worksheets, these tables consist of rows and columns of data. Multiple tables in a relational database can be linked by their common fields: an inventory file, for example, can be linked to an orders file by a common product number.

To manipulate database tables, Codd helped develop Structured Query Language, or SQL. SQL contains the com-

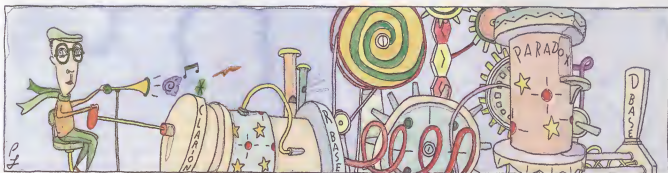
mands needed to create, update, and maintain relational database tables. Because there is only a single "true" SQL, an SQL program written for *Paradox* 3.5 should also work with IBM's *DB2* main-frame database program or with Microsoft's *SQL Server*.

Buying Decisions

If you want a database that's inexpensive, accessible, and effective, take a look at *PC Magazine*'s July 26 issue, which compares six flat-file databases. *PC* recommends Borland International's *Reflex* 2.0 and ButtonWare's *PC-File* 5.0, blessing each with an Editor's Choice award. The review cited in particular the "features and values" of the low-cost programs, which sell for \$249.95 and \$149.95, respectively.

Reflex can only enter one file at a time, but it compensates for that limitation by incorporating a full range of spreadsheet-like cross-tabulation features and extensive reporting and graphing capabilities. With "a full set of Lotus 1-2-3-style @functions" for its crosstabs, queries, reports, and graphics, *Reflex* is, says *PC Magazine*, "the most exciting product of the flat-file databases."

PC-File, on the other hand, can make use of multiple database files, and its bar





EXECUTIVE SUMMARY

Low-End Databases

Q&A 3.0 (Symantec) A consistently lauded, all-inclusive database, Q&A includes a word processor, a multifile database, and an easy-to-use Query-by-Example engine (the Intelligent Assistant) that makes it a true powerhouse for users of all stripes. Q&A can access and use data located in other Q&A database tables but cannot update them. The Intelligent Assistant can "learn" the user's preferred querying language and return ever-more-accurate results as it builds an understanding of those phrases.

Reflex 2.0 (Borland International) Easy to use, powerful, and capable, Reflex lends itself to small applications that require extensive analysis capabilities. Its crosstab feature enables users to summarize and analyze the contents of an entire database. A capable built-in graphics module increases reporting flexibility. Embedded @functions (similar to those in *1-2-3*) can be used in reports and queries. If you need quick, simple, and potent access to your data, this is the one.

PC-File 5.0 (ButtonWare) Inexpensive is the key word here. At only \$129.95, PC-File remains the lowest priced of all databases worthy of the name. But low cost doesn't mean low

powered, and PC-File provides multifile reporting capabilities unusual in a program of its class. A separate graphics module can produce PostScript files, and you can program applications to make the underlying database essentially transparent to novice users.

High-End Databases

R:Base 3.0 (Microrim) Rbase has risen to top status with its inclusion of a full-blown SQL implementation and its own interactive querying language. This new version includes pull-down menus and a Query-by-Example facility that make it easy to find the information you need, even from multiple databases. Reviewers, however, are suggesting that the next version will likely have fewer bugs and that you might want to wait for its release, due by press time.

Paradox 3.0 (Borland International) Paradox 3.0 is often lauded for its interactive environment, which can be used by database pros or novices. Power is no problem here—Paradox has one of the most sophisticated Query-by-Example facilities around. The Paradox Application Language is extensive and highly regarded. Version 3.5, released in September, supports SQL and can act as a front end to

the Microsoft SQL Server. The combination of SQL and an accessible, interactive interface makes it a state-of-the-art PC database.

Clarion Professional Developer (Clarion Software) Design a completely new database language, wrap some hefty interactive development tools around it, and you have Clarion Professional Developer. The program makes short shrift of creating the screens, menus, and reports that generally drive programmers crazy, and users need only a run-time module to run the completed application. Corporate developers who work on strict do-it-now deadlines give Clarion Professional Developer consistently high ratings.

dBase IV 1.1 (Ashton Tate) Ashton Tate owned the PC database market in 1982 but took a headlong slide with dBase IV 1.0 last year. This year's update corrects many of the problems found in the earlier release, but it is still a fairly mediocre high-end product that barely competes with others. Its strengths include plenty of screen- and report-development tools and the ability to weld these together with an integral applications generator. Its failings include inadequate file-updating techniques and a less-than-stellar SQL implementation.

and pie charts outshine those available in Reflex. PC-File can read and write dBase III data files, an accomplishment of no mean significance in terms of compatibility. While Reflex can import and export dBase files also, you're forced to convert files at both ends of the process.

Government Computer News (GCN) agreed with PC's findings in its May 14 Product Preference Survey, in which Reflex scored first in ease of use and won "a particularly strong score" for its interface. PC-File fared less well in the GCN study, ranking fourth out of seven overall, but took first place for its "value relative to price and ease of installation."

PC-File scored a fairly high 7.9 score in PC Week's May 14 issue, tying for second place in a field of six database programs. Echoing PC Magazine's assessment that

PC-File has "superb multifile reporting facilities," PC Week awarded the software the highest "report generator" rating in its study.

PC-File also boasted the lowest price of the PC Week review group of so-called programmable databases. Though they don't have extensive programming languages, these databases can all be "programmed" through menu selections to create custom screens, reports, and menus that insulate users from the underlying database technology.

PC Week also cited Symantec's Q&A as a strong performer in this category. Q&A includes features not available in other databases, such as an integrated word processor and a database-querying tool. While remaining a top contender (PC Magazine came close to giving it an Edi-

tor's Choice award), the consensus is that Q&A is losing ground in the ease-of-use category. Symantec has taken heed; the program is reportedly going to be replaced with a more powerful version that boasts network support.

In the second category are more-expensive relational databases, which work with multiple files and are fully programmable. You can create custom applications for people who know nothing about database technology by using full-blown programming languages and menu-selectable "programming tools."

The top relational contenders are Borland International's Paradox 3.0, Ashton-Tate Corp.'s dBase IV version 1.1, and Microrim's Rbase 3.0. Not to be overlooked is Clarion Software Corp.'s Clarion Professional Developer, which hasn't



More Tips on Using Lotus Products

1-2-3

Macro for monthly totals

Here is a macro that totals values by month. The following figure shows a series of dates in column A, which I entered using the @DATE function and assigned the Date 2 format. Corresponding sales values are in column B.

	A	B	C	D
1	Date	Sales		
2	01-Jan	250.45		
3	30-Jan	303.45		
4	01-Feb	150.77		
5	15-Feb	21.88		
6	01-Mar	199.50		
7	01-Oct	38.75		

The macro places totals for each month's sales into column C in the row that contains the last entry for that month. When the macro reaches the last entry, it places a double underline at the bottom of the monthly sales figures and totals the values in column C, as shown in the following figure.

	A	B	C	D
1	Date	Sales		
2	01-Jan	250.45		
3	30-Jan	303.45	553.90	
4	01-Feb	150.77		
5	15-Feb	21.88	172.65	
6	01-Mar	199.50	199.50	
7	01-Oct	38.75	38.75	
8			=====	
9			\$964.80	

To create the model, enter the labels, dates, and values shown in columns A and B. The dates in column A must be in ascending order. Enter the labels shown in cells E1, E4, and E11 and in range F4..F14 in the following figure, omitting the tinted cells. Precede the labels in cells E4, F8, and F12 with a label prefix.

	E	F	G	H	I	J	K	L
1	Date	0						
2								
3								
4	\t	{CALC}						
5		{IF @CELLPOINTER("type")="b"}{BRANCH total}						
6		{IF @MONTH(A2)=@MONTH(A1)}{DOWN}{BRANCH \t}						
7		{LET hold,@MONTH(\$E\$1)}{CALC}{RIGHT 2}						
8		@DSUM(\$tbl,1,\$critrng)/RV"/RF,2"(LEFT 2)						
9		{DOWN}{BRANCH \t}						
10								
11	total	{UP}{END}{RIGHT}{DOWN}\="">{DOWN}						
12		@SUM({UP 2}{LEFT}{END}{UP}{RIGHT}...{LEFT})						
13		{END}{DOWN}{RIGHT}"/RFC2"						
14		{QUIT}						

Use the Range Name Labels Right command to assign the labels in range E4..E11 to the adjacent cells in column F. Use the Range Name Create command to assign the following range names:

Name	Range
crit	E2
critrng	E1..E2
hold	F2
start	A2
tbl	A1..B7

Enter the following formulas:

Cell	Formula
E2	@MONTH(start)=\$hold
F6	+{IF @MONTH(A*{@STRING (@CELLPOINTER("row")+1)&})= @MONTH(A*{@STRING (@CELLPOINTER("row"),0)&})} {DOWN} {BRANCH \t}-"
F7	+{LET hold,@MONTH (*{@CELLPOINTER("address")&}) (CALC)-{RIGHT 2})

Save the file before you invoke the macro.

To use the macro, place the cell pointer in cell A2, which contains the first date. Hold down the MACRO key (Alt on most computers) and press T.

Ann M. Marcus
LOTUS staff

Printing cell formulas

When I print cell formulas in 1-2-3 Release 3 by selecting /Print Printer Options Other Cell-Formulas, my printouts ignore the top, bottom, left, and right margins. Text and long formulas print to the left and right edges of the paper.

To get around this, I use a setup string to set the right margin. For example, the following setup string sets the right margin to 40 on an Epson FX-85 printer:

```
\027Q:40
```

Refer to your printer manual for the appropriate setup string, and Select /Print Printer Options Setup to enter it.

Curt Dukeshire
Customer Support Dept.
Lotus Development Corp.

Home-brewed @function: @RELEASE

My company is upgrading from 1-2-3 Release 2.01 to 1-2-3 Release 2.2, and I am upgrading several macros to take advantage of the new macro commands in Release 2.2. The macros must run in both releases. However, if I run new Release 2.2 macros in Release 2.01,



they often result in an ERR, and the macro does not execute.

To address this problem, I developed the following formula to determine the release I am using. I enter the formula in cell B1 of the figure below:

```
@CHOOSE(@ISERR(@CELLPOINTER
("filename")), "2.2", "2.01")
```

	A	B	C	D
1	release	2.2		
2				
3	\v	(IF release="2.2")(BORDERSOFF)		
4		(GOTO)customhelp		

Here's how the formula works: @CELLPOINTER("filename") is a Release 2.2 @function that returns the path and file name of the current file. In Release 2.01 it returns ERR. @ISERR returns 1 if its argument yields an error, 0 if it does not. The @CHOOSE command then returns the name of the release I am using: Release 2.2 if @ISERR returns 0, Release 2.01 if @ISERR returns 1.

I use this formula in conjunction with my macros to execute Release 2.2-only commands if I am in Release 2.2 and to ignore Release 2.2-only commands if I am in Release 2.01.

To see how this formula works, enter the labels in the figure. Precede the label in cell A3 with a label prefix. Assign the labels in column A as range names for the adjacent cells in column B. Select /Range Name Labels Right and specify range A1..A3.

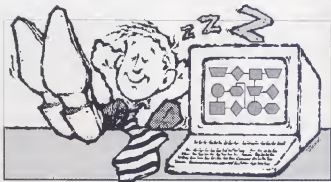
The \v macro calls a custom help screen (not shown). If I am in Release 2.2, the macro uses the {BORDERSOFF} command to suppress the display of the screen borders. However, if I am in Release 2.01, this new Release 2.2 macro command yields an ERR and terminates the macro.

To avoid this, I inserted the command (IF release="2.2") before the {BORDERSOFF} command. If a coworker runs this macro in Release 2.2, the borders will be suppressed. The macro will run in Release 2.01, but the borders will be displayed. I use this technique whenever I write a macro with a Release 2.2-only macro command.

The Release 2.2 *Upgrader's Handbook* lists 12 new macro commands:

```
{BORDERSOFF}
{BORDERSON}
```

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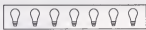
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[FRAMEON]
[GRAPHOFF]
[GRAPHON]
[INDICATE]
[PANELOFF]
[SYSTEM]
[WINDOWSOFF]
[WINDOWSON]

Some of these commands are in Release 2.01, but they work differently in Release 2.2. For example, the *string* argument in the [INDICATE] command is no longer limited to five characters. For a brief description of these commands, read page 3-11 in the Release 2.2 *Upgrader's Handbook* and Chapter 14 in the *Reference Manual*.

J. Michael Dittoe
Louisville, Ky.

Autoexec No

In 1-2-3 Releases 2.2 and 3 [and 3.1], you can turn off autoexecution by selecting /Worksheet Global Default Autoexec No. This setting lets you retrieve a file containing an autoexecuting macro without automatically executing the macro. When I create a file with a \0 macro, I save a copy of the file with Autoexecute set to No so that I can easily retrieve and edit it. Since I don't have to stop the macro after it has started, I can be sure that it hasn't altered the worksheet.

E. Anthony Golda
Gresham, Ore.

Specifying multiple Print ranges

If you want to print more than one range in 1-2-3 Release 3, you don't have to issue a command for each range. Select /Print Printer Range. When you are prompted to enter a Print range, enter all of the range addresses, separating them with commas. For example, if you enter A1..A7,A10,Z100,AZ224..AZ300 and select Go, the contents of those cells and ranges print.

Kelly Anderson
Rock Hill, S.C.

Keep in mind that 1-2-3 Release 3 will print only the text that is highlighted. Text that

extends into unselected cells will not print. We recommend that you use a semicolon instead of a comma as an argument separator. The semicolon remains valid regardless of the current Worksheet Global Default Other International Punctuation setting.

You can also include a graph as part of a multiple Print range by preceding the name of the graph with an asterisk. For example, select /Print Printer Range and enter the following:

A:A1..AB10;*BAR_1;B:Y100..BZ108

Disable UNDO to save memory

If you're working on a large worksheet in 1-2-3 Release 2.2 and you know that you're running out of memory, disable the UNDO feature. Select /Worksheet Global Default Other Undo Disable. By disabling UNDO, you disable the temporary backup copy of your worksheet that UNDO creates and free up the memory it occupied.

Kay Clark
Euclid, Ohio

Select /Worksheet Global Default Other Undo Disable Update Quit to update the 1-2-3 configuration file (123.CNF) so that 1-2-3 doesn't automatically invoke UNDO when you load the program in future sessions.

If you turn off the UNDO feature, then retrieve a worksheet or attach an add-in, you won't be able to turn UNDO back on. 1-2-3 can't reserve the memory it needs for the undo buffer once you have retrieved a worksheet or attached an add-in. Because the program must allocate enough memory to back up the largest possible worksheet, it reserves more than half of your computer's available conventional memory for the undo buffer. If you retrieve a file and realize that you need the UNDO feature, save the file, select /Worksheet Erase Yes, invoke UNDO by selecting /Worksheet Global Default Other Undo Enable Quit, and then retrieve your file.

Clip-and-paste macro

My clip-and-paste macro provides a multiple-copy feature that is not found in 1-2-3.

To create the macro, enter the labels in range A1..B7. Precede the labels in cells A1 and A7 and in range B4..B7 with a label prefix. Use the Range Name Labels Right command to assign the labels in range

	A	B	C	D
1	\c	(PANELOFF)		
2		(WINDOWSOFF)		
3		(ONERROR skip)		
4		/RNDclip		
5	skip	/RNCclip		
6				
7	\p	/Cclip		

A1..A7 as range names for the adjacent cells in column B. To start the macro, hold down the MACRO key (Alt on most computers) and press C. Here's how the \c macro works:

{PANELOFF} freezes the control panel and status line until 1-2-3 encounters a {PANELON} command or until the macro ends.

{WINDOWSOFF} freezes the worksheet area of the screen, including the worksheet borders.

{ONERROR skip} traps the error that results if the range name *clip* doesn't exist and branches macro control to *skip*.

/RNDclip selects /Range Name Delete and specifies the name *clip*.

/RNCclip selects /Range Name Create, specifies the name *clip*, and allows you to highlight the range assigned to *clip*.

To copy the contents of *clip*, press MACRO-P.

Dan Smith
N. Ft. Meyers, Fla.

1-2-3 / Symphony

Batch files in 1-2-3 and Symphony

The value of batch files in loading 1-2-3 or Symphony is well known. There's a good description of their use in the June issue (pages 92-94). Unfortunately, Good Ideas recommended using EDLIN or the DOS COPY CON command to create batch files.

1-2-3 and Symphony users have a better option: Use 1-2-3 or Symphony.

To create a batch file, enter the commands in the worksheet and print the range containing the commands to a file.

For example, to create a batch file that loads to your 1-2-3 subdirectory and changes 1-2-3, enter the labels shown in the figure at the top of the next page. Replace the 123 in cell A1 with the name of your



1-2-3 program subdirectory.

Print the range to a file by selecting

	A	B	C	D
1	cd\123			
2	123			

/Print File. Enter the path and name of the batch file (for example, C:\123.BAT), select Range, and specify A1:A2. Next, select Options Other Unformatted Margins None Quit Align Go Quit. In *Symphony*, select SERVICES Print Settings Destination File. Enter the path and name of this batch file (for example, C:\SYM.BAT), select Source Range, and specify A1:A2. Select Margins No-Margins Quit Align Go Quit.

To use the batch file, enter 123 or sym at the DOS C> prompt.

George L. Hopkins
Greensboro, N.C.

1-2-3 Release 2.01 doesn't have a None option when you select /Print File Options Other Unformatted Margins. Set the left margin to 0, the right margin to 240, and the top and bottom margins to 0.

Logs with a base <> 10

The @LN function in 1-2-3 and *Symphony* computes the logarithm of a number to the base *e*. The @LOG function computes the logarithm of a number to the base 10.

To compute the logarithm of a number *y* to the base *x*, use either of these formulas:

@LOG(Y)/@LOG(X)

@LN(Y)/@LN(X)

Glen McDonald
Customer Support Dept.
Lotus Development Corp.

Symphony

@APP

You can use the @APP function in any release of *Symphony* to determine whether a specific add-in is attached. The syntax of the @APP function is @APP ("application_name", number).

The formula returns the number if the application is attached; it returns ERR if the application is not attached. For exam-

ple, @APP("allways",2) will return 2 if *Allways* is attached.

The @APP function is not listed in the on-line Help @function indices nor in the @function section of any *Symphony* manual. The documentation for *Symphony* Release 2.x refers to @APP in the context of the Optimal Recalculation command. *Symphony* Release 2.2 Appendix A-1 documentation mentions using @APP to control *Allways* with macros. You can use @APP to test for the presence of an add-in with a macro.

Eddie English
Customer Support Dept.
Lotus Development Corp.

Tutorial in Symphony 2.2

Symphony Release 2.2 doesn't contain a tutorial add-in, but you can use the Tutorial add-in that came with *Symphony* Releases 1.1, 1.2, and 2.0.

Copy the file TUTORIAL.APP from the *Symphony* Help and Tutorial Disk (5¼-inch version) or from the *Symphony*

Program Help and Tutorial Disk (3½-inch version) to the *Symphony* 2.2 program directory on your hard disk. Next, copy all the files from the *Symphony* Tutorial Lessons Disk (5¼-inch version) or from the Master Library and Tutorial Lessons Disk (3½-inch version) to the same program directory.

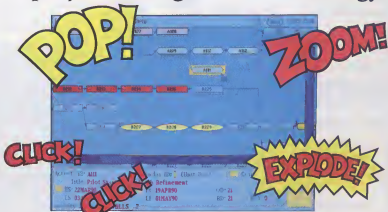
To run the tutorial in *Symphony*, select SERVICES Application Attach, specify TUTORIAL.APP, and select Invoke Tutorial. The tutorial menu will appear.

Linda Hartley
Customer Support Dept.
Lotus Development Corp.

This material was prepared by the Technical Editors, with the help of the Lotus Customer Support staff.

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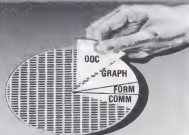
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1-2-3 / Symphony

Where do those range names go?

Q In cell B1 in the following figure, I entered a formula with range names. The top line in the control panel shows the formula that I entered, and the second line shows the formula as it appears in Edit mode. I want to edit the formula that I entered. Otherwise, what's the point of using range names?

B1: @DCOUNT(\$DBASE,0,\$CRIT)
@DCOUNT(\$A\$10..\$H\$75,0,\$M\$10..\$P\$11)

	A	B	C
1		0	
2			

Pam Rapill
Olympic Packaging Inc.
Mundelein, Ill.

A It's an inconsistency built into all releases of 1-2-3 and Symphony except 1-2-3 Release 3.

If you're willing to play with macros, try the following one, which we've run in past issues to deal with this problem.

To create the macro, enter labels as shown, omitting the entry in cell B3. Begin the entry in cell A1 with an apostrophe label prefix.

Use the Range Name Labels Right command to assign the labels in column A as

	A	B	C	D	E	F	G	H
1	1e	(LET form,@CELLPOINTER("address"))						
2		(RECALC next)						
3	next	ERR						
4		(LET form,@TRIM(form)){form}{EDIT}						
5								
6	form							

range names for the adjacent cells of column B. Then enter the formula "+[CONTENTS form,"&form&","240,117]" into cell B3.

To use the macro, move the cell pointer to the cell you wish to edit. Then hold down the MACRO key (Alt on most computers) and press E. The formula that you entered appears on the second line of the control panel.

Use this macro instead of the EDIT key in all your worksheets or in a Hyperspace macro library. But beware. The macro alters formulas that contain sequences of two or more space characters within quotation marks. It automatically reduces any series of spaces to a single space.

Sum negative numbers

Q I have a spreadsheet with many columns of 12 or more numbers. Each column has both positive and negative numbers. For each column, I wish to find the sum of the positive numbers, the sum of the negative numbers, and the sum of all the numbers.

I've created the requisite formulas by using a long sequence of @ABS functions. But there must be an easier way.

Owen Sondergaard
Bethesda, Md.

A The figure on the right shows the type of data you describe.

With this arrangement of data, you need to write rather complex formulas to sum the negatives, the positives, and both the negatives and the positives. However, if you change your worksheet's layout, you can use

simple @DSUM and @SUM formulas.

To begin, enter a header at the top of each column that contains numbers to sum. To insert a row above row 1, select /Worksheet Insert Row (in Symphony, MENU Insert Rows), indicate a cell in row 1, and press Return. Then enter the label Header in cell A1. Copy cell A1 to range B1..C1 and to cell A13.

Now you can write the summation formulas. The @DSUM function that is the basis for your calculations works like a database query command. It uses a criterion in a Criterion range to determine which values it should sum. In this case, you want it to sum all values within a column that are less than 0. Enter the criterion formula +A2<0 in cell A14.

In order to sum the negative values in column A, enter the following @DSUM formula in cell A10:

@DSUM(A1..A7,0,A13..A14)

This expression means "Sum the entries from the range A1..A7 that match the criterion in range A13..A14." In this example, the answer is -33.

Instead of creating a second Criterion range, you can use simple arithmetic to sum the positive values in column A. Enter the formula @SUM(A2..A7)-A10 in cell A9. The result is 88. To sum column A, enter the formula @SUM(A2..A7) or the formula +A9+A10 in cell A11. The result is 55.

	A	B	C	D
1				
2	-1	-1	-2	
3	-10	-10	-9	
4	42	40	-10	
5	46	43	12	
6	-9	-8	34	
7	-13	-7	-3	

To use these formulas for all the columns that contain data, copy range A9..A14 to range B9..C9. Your worksheet should look like the one on the next page.

Make sure that the ranges used in the

	A	B	C	D
1	Header	Header	Header	
2	-1	-1	-2	
3	-10	-10	-9	
4	42	40	-10	
5	46	43	12	
6	-9	-8	34	
7	-13	-7	-3	
8				
9	88	83	46	
10	-33	-26	-24	
11	55	57	22	
12				
13	Header	Header	Header	
14	1	1	1	

@DSUM and @SUM formulas are large enough to include values in the longest column that you want to sum. Blank cells in shorter columns of data do not affect the calculations.

Revisited

Fill a column with numbers

In the September 1989 issue, page 94, you explained to Lisa Buttiglieri how to enter a series, such as 1), 2), 3), and so on, in a column. I use a different approach.

Suppose the list starts in cell A1. Enter the characters "1" in cell A1, then enter the following formula in cell A2:

```
@STRING(@VALUE(@LEFT(A1,@LENGTH
(A1)-1))+1,0)&"")
```

Copy the formula down column A as needed, then convert the formulas to their resulting values. Select /Range Value (in *Symphony*, MENU Range Values), indicate the range of formulas in column A as the range to copy from, and indicate cell A2 as the range to copy to. Then use the Range Label Right (in *Symphony*, Range Label-Alignment Right) command to right-align the labels.

William G. Frakes
Rochelle, Ill.

The editor replies: People who use 1-2-3 Release 2.2 and *Symphony* can use this formula in a macro and store it in a macro library. Those who use 1-2-3 Release 3 can store it in a worksheet with other macros and open that worksheet during any work session.

The 1-2-3 macro appears in the first figure above; the *Symphony* macro is below it.

To create the macro, enter the labels as

shown. Be sure to start each of the entries in range A1..B3 (in *Symphony*, range A1..B2) with an apostrophe label prefix. Note that the first visible character in cell B1 is an apostrophe, so you must type two apostrophes to begin the cell entry.

After you enter the labels, assign the name \n to cell B1. Press slash (/ in *Symphony*, MENU), select Range Name Labels Right, and indicate cell A1. To use the macro, move the cell pointer to the cell where you want the list to begin. Hold down the MACRO key (Alt on most computers) and press N.

The macro enters the label 1) into the current cell, moves the cell pointer down, and enters the formula. Then the macro issues the Copy command and waits for you to indicate the range to copy to. After you highlight the range and press Return, the macro copies the formula and then converts the formulas to their resulting values. Finally, the macro issues the Range Labels Right command to right-align the labels.

More on a column of numbers

I have an alternative approach to filling a column with a series of numbers. My method uses the Currency format in a nontraditional way.

1-2-3 lets you choose the appropriate currency symbol, such as a dollar or yen sign, for the type of currency represented in your worksheet. However, if you don't need the Currency format in the current worksheet, you can change the dollar sign that precedes values in cells formatted for currency to a closing parenthesis that follows the values. In 1-2-3 make the switch by selecting /Worksheet Global Default Other International Currency. Press the Backspace key to remove the existing character, then type a closing

parenthesis. Press Return and select Suffix, then select Quit Quit. To save the change for future work sessions, select Quit Update Quit after you select Suffix.

Use the Data Fill command to enter a list of numbers in the worksheet. Then assign the Currency format with zero decimal places to that range.

When you change the currency symbol, 1-2-3 won't display the dollar sign in any worksheet you create or retrieve during the current session. To restore the dollar sign, select /Worksheet Global Default Other International Currency, press the Backspace key to remove the character, then type a dollar sign. Press Return and select Prefix, then select Quit twice.

Bernard D. Vaillette
Leominster, Mass.

The editor replies: To use this technique in *Symphony*, select SERVICES Configuration Other International Currency, replace the existing character with a closing parenthesis, and select Suffix from the resulting menu. Then select Quit Quit. Or select Quit Update Quit to save the change for future sessions. Use the Range Fill command to enter a list of numbers, and assign the Currency format with zero decimal places to that range.

1-2-3

Problems riding the range

Q There's an inconsistency in 1-2-3 that causes problems in some macros. It has to do with the behavior of the "free" corner of a highlighted range when you press the period key.

While you're highlighting a range, you can press the period key to shift the cursor within the highlight from one corner to the next around the perimeter

of the range. For example, suppose that the cell pointer is in cell A1. You select /Print Printer Range and highlight range B2..C4.

Before you press Return to lock in the Print range, the cursor is in cell C4 of the highlighted area. When you press the period key, the cursor jumps to cell B4. When you press the period key again, the cursor jumps to cell B2, and one more press moves the cursor to cell C2. In any case, range B2..C4 remains highlighted. Press Return to specify range B2..C4 as the Print range.

Here's the advantage of this function: It lets you expand a highlighted range upward and to the left, as well as downward and to the right. The highlighted corner that contains the cursor is the one that moves to expand the highlight when you press a cursor-movement key.

Here's the problem: The first time you highlight a Print range, pressing the period key moves the cursor from corner to corner clockwise around the range. If you then quit the Print menus and reselect /Print Printer Range, pressing the period key moves the cursor counterclockwise around the range. Quit the Print menu and reissue the command and the cursor moves clockwise once more. Press the Return key.

As long as you're working manually with 1-2-3, this alternating direction isn't a problem. However, it can really mess things up when a macro is running. It's impossible to know which corner the pointer will occupy after a macro presses the period key. Am I missing something?

Shane Devenshire
Training Works
San Francisco, Calif.

A The original 1-2-3 documentation affectionately dubbed this movement of the cursor within a highlighted range "riding the range." If your problem is as clear-cut as you describe, the solution is simple: Have the macro issue the Print Printer Range command twice each time it's needed once. The second command instructs the cursor to ride the range in the clockwise direction the next time the command is issued.

Unfortunately, you can't predict which direction the cursor will jump each time you issue the command. Sometimes pressing the period key makes the cursor ride the range

clockwise or counterclockwise twice in a row.

Still, if your only interest in riding the range is to extend the highlight upward or to the left, it doesn't matter which way the cursor moves when you press the period key. Simply press the key twice (or have the macro press the key twice), and the cursor moves, either clockwise or counterclockwise, to the top-left corner of the range.

If, for some reason, your macro must shift the cursor to the bottom-left or top-right corner of a highlighted range, you'll need a scheme to manage the movement. The macro steps in the following figure make the cursor ride the range from the bottom-left corner to the bottom-right corner either clockwise or counterclockwise.

To try out the macro, enter the labels as shown. Precede the entries in cells A3 and B3

	A	B	C	D	E
1	botright				
2					
3	/r	/PPR			
4		(LET botright,@CELLPOINTER("row"))..			
5		(IF @CELLPOINTER("row")<>botright)..			
6		(IF @CELLPOINTER("row")<>botright)..			

with a label prefix. Use the Range Name Labels Right command to assign the labels in column A as range names for the adjacent cells in column B. Run the macro by holding down the MACRO key (Alt on most computers) and pressing R. Highlight a Print range and exit the Print menu. Each subsequent run of the macro causes 1-2-3 to highlight the Print range and makes the cursor ride the range to the bottom-left corner. The macro works even for one-row ranges.

Contest

This month's contest asks for a method of performing a lookup based on a looked-up label. For example, the table in the first figure contains three values in the first column and three labels in the second column.

Your solution should use the value in the cell labeled *input1* (cell B5) to return

	A	B	C
1		1 Low	
2		2 Med	
3		3 High	
4			
5	input1	2	
6	input2	3	

the name of one of three secondary tables.

Based on the result of the first lookup,

	A	B	C
8		1	50
9	low:	2	85
10		3	93
11			
12		1	120
13	med:	2	155
14		3	180
15			
16		1	220
17	high:	2	250
18		3	290

your solution should use the appropriate secondary table to look up the value in the cell labeled *input2* (cell B6).

In other words, come up with a technique that returns a value from table *low*, *med*, or *high* based on the value in the cell named *input2*. The table to use for this lookup should be determined by the table name looked up in the first table, based on the value in the cell named *input1*. For example, given the entries shown in *input1* and *input2*, your solution should return 180—the value associated with the number 3 in the table whose name is associated with the number 2.

Special thanks to Ray Tetrault in Chatham, Ontario, for submitting the question for this contest.

The first 25 people who submit what the *LOTUS* judges consider the best answer will receive a *LOTUS* Swiss Army knife.

Please send a disk copy and a printed copy of your answer, with appropriate documentation. All entries must be postmarked by midnight, December 31, 1990. We will announce the winners in the March 1991 issue. Send your answers to **December Contest**, *LOTUS* Magazine, P.O. Box 9123, Cambridge, MA 02139-9123.

This material was prepared by Daniel Gas-teiger and the Technical Editors, with the help of the *LOTUS* Customer Support staff.

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